Railway Age

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Wanted—a Permanent Track Construction

A *RAILROAD* track may well be compared to a gravel or macadam highway in that neither can be kept in condition to handle traffic without the expenditure of continuous efforts to repair the damage done by the traffic. Furthermore, such expenditure bears a definite relation to the traffic density. We have seen how the growing expenditures for the maintenance of such highways with the increase in traffic has led to the construction of rigid, hard-surface roadways with a resulting reduction in the maintenance expenditures. But although increased density of traffic on the railroads has resulted in mounting expenditures for maintenance of way no consistent effort has yet been made toward the development of what might be called a permanent railway track, in which upkeep would be restricted to the replacement due solely to wear of the roadway surface, that is, the rail. Such efforts as have been made thus far towards so-called permanent track have been restricted largely to stations where cleanliness rather than solidity was the first consideration, or to such construction as that in the Chicago Union Station where provision for a solid roadbed has been effective in reducing ratther than eliminating expenses for surfacing. For this reason the proposed plan for permanent construction offered by President Alfred of the Pere Marquette, as described elsewhere in this issue, is worthy of careful analysis. Unquestionably such a suggestion raises formidable difficulties. Its use on new roadbed is virtually precluded because of the complications introduced by settlement, while on existing lines the building of the concrete roadway immediately suggests the necessity for setting up the well-known "detour" sign until the work is finished. Furthermore, railroad expenditures are not to be made with the free hand so characteristic of state legislatures. Nevertheless the cost of maintaining track in the face of growing traffic density does point to the need of a thorough trial of some such plan as that suggested by Mr. Alfred, for, as stated in his article, the actual saving to accrue from such construction cannot be determined without trial.

Locomotive Maintenance Standards Raised

THE extension of locomotive runs on American railroads has necessitated improved methods of inspection and higher standards of maintenance in order that locomotives may successfully run past division points where they formerly received attention. A somewhat unexpected, but nevertheless welcome, by-product has been the reduced maintenance cost per locomotive mile, which has been experienced particularly on those roads which have been most successful in raising maintenance standards. The reason for this reduced unit cost doubtless may be found in the fact that minor defects are located and corrected while this work can be done with a minimum expenditure of time and labor. Moreover, the locomotive is a unit, defects or wear in one part usually being communicated in excessive form to others. For example, "driving box pound," or in other words, excessive play between driving boxes and shoes and wedges, if not corrected promptly, accelerates the wear of rod bushings and knuckle pins, in some cases causing broken rods, crank pins or frames. Too much play between crossheads and guides introduces excessive stress into those parts, also into main rods, piston rods and crank pins as well as contributing to cylinder packing and bushing wear. With regard to play, or limits of wear, between crossheads and guides, the Division of Locomotive Inspection of the Interstate Commerce Commission rules that it may not exceed ¼ in. vertical and 5/16 in. lateral play. Realizing the importance of high standards of maintenance, at least one important railroad system in the middle west has established closer limits of wear than are required by law. In the case of the crosshead play mentioned above, for example, this road has a system limit of 3/32 in. vertical and ¼ in. lateral play, or considerably less than that considered by the commission to be essential for safe operation. This road finds that a high standard of maintenance pays. Besides obtaining more reliable and satisfactory operation, its cost of locomotive repairs is only 17 cents a mile, or well down toward the minimum for any road in the country.

No Dangers in Diffused Ownership of Railroads

PROFESSOR WILLIAM Z. RIPLEY in a recent address before the Academy of Political Science at New York made statements which to some degree challenge the efficacy of attempts to improve industrial relationships and solve other social problems by promoting wider diffusion of stock ownership. Such wider diffusion of ownership of securities makes it increasingly unlikely, he maintains, that the owners of property will take an intelligent interest in its management. "The net result . . . ," he says, "is the assumption of an absolute control by intermediaries—most commonly bankers, so-called—in place of the former responsibility for direction which, theoretically at least, rested upon the shoulders of the actual owners." He proceeds to tell of a number of new corporations financed solely by non-voting stocks, the voting stocks being held by bankers whose actual cash investment was little or nothing. The remedy?—Professor Ripley suggests the extension of the activities of such public bodies as the Federal Trade Commission and standardization and publicity for accounts. In this manner public authority would step in to protect the public and the investor in the loss of control by the latter. Public authority does exercise this surveillance over the railroads. It would doubtless be advantageous if greater interest in railroad problems could be aroused on the part

of the employees and the public who have purchased railroad securities. Yet, even if this interest is not aroused, the issuance of railroad securities is rigidly regulated, as is their service, their rates—almost everything they do—and all accounts are matters of public record. Ergo, there is today insofar as the railroads are concerned precisely that protection against any possible danger of irresponsible management which might arise from a wider diffusion of ownership. We rather suspect that Professor Ripley's speech will be widely used by the foes of any kind of rapprochement between employees and management as an argument for their cause—indeed they have already begun to quote it. It may be well, therefore, for railroad men to bear in mind the existing distinction between the railroads and most other industry, as far as Professor Ripley's strictures are concerned.

Increase of Safety on Railways

DEPLORABLE accidents continue to occur on the railways and are commented upon in these columns. The statistics of accidents published by the Interstate Commerce Commission show, however, that there is a steady increase in the safety with which the railways of the United States are operated. Their primary obligations as carriers are to their employees and passengers. Employment on them in the first eight months of this year was safer than ever before, and travel upon them has been safer within the last three years than ever before, although not quite so safe thus far this year as in 1923 and 1924.

The progress that has been made is strikingly illustrated by statistics of the last two decades. In 1904 one man out of each 357 employed by the railways was killed. In 1914 this had been reduced to one employee in 538, and in 1924 to one in 1,164. The record of 1924 as regards safety of employees is the best ever made in any entire year. In the first eight months of 1924, however, one employee in each 1,784 was killed, while in the first eight months of 1925 only one in each 1,824 was killed, which indicates that the record of 1925 will show further improvement. The annual accident figures show that railway employment is less than one-third as hazardous as it was twenty years ago, and less than one-half as hazardous as a decade ago. In 1904 the railways carried 49,712,503 passengers one mile for each passenger who was killed. In 1914 they carried 152,401,815 passengers one mile for each that was killed and in 1924 244,642,919 passengers one mile for each killed. These figures show that travel by rail last year was only about one-fifth as hazardous as twenty years before and only somewhat more than half as hazardous as ten years ago. In 1914 the actual number of passengers killed was 441; in 1907, 610—the highest figure ever reached,—and in 1924 only 149. In the first eight months of 1924 the number of passengers killed was 101, and in the first eight months of 1925 it was 106. It is a notable fact that in spite of the increase in the number of motor vehicles even fatal accidents at highway grade crossings are beginning to decrease. There was a reduction of them in 1924 as compared with 1923, and in the first eight months of 1925 the number of persons killed at grade crossings was 1,324 as compared with 1,359 in the corresponding period of last year. It is doubtful if any other industry in the world can point to a better record in the reduction of accidents during the last two decades than American railways.

There is hardly anything a man can do now, except stay in bed, that is safer than riding in a passenger train. Why, then, do many railways continue to let their ticket agents suggest to passengers that they buy accident insurance? This is in effect saying to the passenger that he incurs unusual dangers when he gets on a train. Since the opposite is true, the sale of accident insurance at ticket offices gives a false and harmful impression. What railway will be the first to discover that it would be good advertising to post some such notice as that, "Our agents do not sell accident insurance because people are safer on our trains than in almost any other place?"

We publish elsewhere under the heading "Train Accidents and Train Control" an interesting letter on the subject of accidents from W. R. Scott, president of the Southern Pacific Lines in Texas and Louisiana. Mr. Scott refers to a statement recently made in an editorial in the *Railway Age* that the rear collision on November 12 near Monmouth Junction, N. J., "constitutes the most complete argument for use of automatic train control that could be cited." He says that our editorial comment "would lead one to believe that the application of automatic train control would prevent all such accidents." This was not the impression intended to be given by this editorial. Every student of the subject must agree with Mr. Scott that "some part of the mechanism (of train control) will at times fail," for there is not, and never will be, any infallible mechanism. All that this paper meant to imply was that the Monmouth Junction collision clearly illustrated the fact that there still occur collisions which the most perfect block system will not prevent, and that, therefore, it constitutes an unusually clear cut argument for train control. The extent to which train control will prevent accidents not prevented by the best means of other kinds now used remains yet to be determined by the crucial test of experience.

We agree with Mr. Scott that "too much stress is generally placed on railway accidents by the public," and the facts already given in this editorial show there is much more reason for stressing railway safety than railway accidents. It might well be added that too much stress is placed on collision accidents in particular. The number of persons killed in such accidents, like the total number of fatalities on railways, is steadily decreasing. The total number of non-trespassers killed in collisions in 1918 was 377; in 1919, 161; in 1920, 158; in 1921, 66; in 1922, 127; in 1923, 75; and in 1924, 67. Unfortunately, however, it is collision accidents that are given the widest publicity and therefore they have importance out of proportion to their number.

The *Railway Age* has not been an advocate of the universal installation of train control. It is under such circumstances as existed at Monmouth Junction, i.e., high speed traffic, short blocks, close headway, that train control should be developed and applied first. The fact that the years of development prior to the issuance of the Interstate Commerce Commission's order in July, 1922, did not produce equipment acceptable to the railroads is demonstrated by the fact that only one of them, aside from the roads on which installations were in service prior to the issuance of the order, was in position to complete an installation by the date originally set, January 1, 1925. It seems also that the members of the commission are not of one mind on numerous vital questions of train control, this being indicated by the seeming delay in making final inspections and rendering final reports on completed installations. Of the twenty-one divisional installations reported as completed, ten were inspected in 1925, and to date a final report has been rendered on only one installation. Mr. Scott pertinently remarks that "much more would be spent and additional devices applied if the railroads had from the Interstate Commerce Commission approval of devices now installed."

The record of the railways demonstrates that there is no unreasonable reluctance on their part to test any method or mechanism that promises to promote safety.

Railways and Motor Transportation

THE growth of motor transportation within recent years has been the most remarkable transportation development since the early construction of railroads. It is presenting important problems to the railways and to government regulating and taxing bodies. Motor vehicles, especially passenger, have been cutting deeply into railway earnings, but the attitude of the railways toward them should not be determined by this fact. The motor vehicle has come to stay, and should be dealt with on its merits by the railways, whether as a competitive or auxiliary means of transportation. It is imposing a heavy burden upon the public for the construction and maintenance of highways, but the public's attitude toward it should be determined not only by what it costs in taxes and other ways, but by what it is worth in the social and economic scheme of things.

As an article which we publish elsewhere in this issue shows, the number of railways that are buying and using motor buses and trucks to meet competition and render better service is increasing rapidly. Numerous urban and interurban electric railways already have had to engage in operating bus lines to meet or anticipate competition or to supplement their rail passenger service. It is the opinion of many who have studied the subject that the time is coming when a large part, if not most, of the buses and trucks operated as common carriers will be owned directly or indirectly by existing steam and electric railway companies. The belief is growing that many concerns and persons who are engaging in bus and truck operation are doing so without adequate knowledge of the probable costs of operating and maintaining their vehicles, that such "fly by night" operators cannot stay in business long, and that ultimately it will be best for all concerned—manufacturers, operators and public—for companies and individuals without adequate business knowledge and judgment and ample financial resources to be eliminated and motor and common carrier service to pass into the hands of strong companies and particularly to a great extent into the hands of steam and electric railways.

There are, however, certain important questions regarding the operation of motor buses and trucks which are unsettled and which must be somewhat definitely answered before motor transportation service can be put on a stable basis. One of these questions is as to how motor vehicles operating on public highways as common carriers are to be taxed. Another is as to how they are to be regulated.

There has been complaint from the railways because of the taxes they are obliged to pay to help construct and maintain highways upon which motor vehicles compete with them. Spokesmen of the motor industry sometimes have replied by showing that the total taxes paid on motor vehicles are larger than on railroads and by referring to the large amount of freight business that the motor manufacturing industry gives to the railways. But while part of the taxes collected from the railways are used to pay for the highways upon which motor vehicles operate, none of the taxes paid on motor vehicles are used to help provide highways for the railways. Furthermore the nation's direct and indirect expenditure for motor transportation is now much greater than its total expenditure for rail transportation. Besides, a large part of the taxes paid upon motor vehicles are levied upon private passenger automobiles. Now, the operation of private passenger automobiles is not in any way comparable with the operation of railways. On the other hand, the operation of motor buses and trucks as common carriers is strictly comparable with that of railways. These vehicles, unlike private passenger automobiles, and like railways, are used for specific business purposes and profit. Therefore the amount of taxes paid upon all motor vehicles is no indication whether the taxes being levied upon motor buses and trucks are adequate or inadequate.

The railways operate on highways that they themselves construct and maintain while buses and trucks operate over highways which the public constructs and maintains. But if there is no good reason why the general tax paying public should defray any of the cost of building and maintaining the highway upon which a railway operates, then there seems to be little reason why the general tax paying public should defray a large part of the cost of highway construction and maintenance that is made necessary by the operation of buses and trucks for hire. If it costs a given amount per mile to build and a given amount annually to maintain a highway for the operation of private automobiles, and more than these amounts to build and maintain a highway for the operation of buses and trucks also, then it seems a reasonable conclusion that the difference in the fixed charges on the construction costs and in the maintenance costs should be paid by the owners of the buses and trucks. It is true that motor common carriers render a service that benefits society, but so do railway common carriers, and the railways pay their own costs of construction and maintenance and reimburse themselves through the rates charged those who use railway service.

There is also complaint from the railways that motor bus and truck lines are allowed in most parts of the country to engage in competition with them without any of the strict regulation of their rates and service to which the railways are subjected. The railways are required to render continuous service throughout the year. In many parts of the country motor truck and bus lines compete actively with the railways when the weather and other conditions are favorable, but largely suspend business when conditions are not so favorable. They take traffic when the railways could best handle it and throw it back on them when they are least able to handle it. Motor bus and truck lines should be required to get certificates of public convenience and necessity to do inter-state business as well as intrastate business and should be required to make all reasonable efforts to render a continuous service throughout the year. They should be subject to regulation, as the railways are, to see that they take all necessary precautions to operate safely, and before engaging in operation should be required to show that they can be held financially responsible in case of accidents. They should be compelled to publish and file their rates with public service commissions and to maintain them.

There can be no question that the more extensively steam and electric railways engage in the operation of motor vehicles the more likely such principles of taxation and regulation as have been indicated are to be applied to motor transportation. If the application of these principles to railways or to motor transportation lines directly or indirectly controlled by them is fair and desirable, then their application to other motor transportation lines now would be fair and desirable.

Whether the principles stated are sound or not, the sooner the way in which motor common carriers are to be taxed and regulated is settled the better it will be. There is a growing public sentiment in favor of increasing regulation and taxation of motor carriers, and it would be very unfortunate for all concerned if motor transportation should be developed on a large scale and later policies of taxation and regulation should be adopted which would force a restriction of the number of buses and trucks made and used.

The railways have been criticised for not having themselves engaged extensively in the operation of motor buses

and trucks. The article published elsewhere in this issue shows that railways in all parts of the country are making various kinds of experiments, both in trying to meet motor competition and in the operation of motor vehicles. They are naturally in many ways auxiliaries of railways, and already the increasing use of motor trucks is helping to solve certain difficult railroad problems. For example, the extreme congestion within the Chicago switching district which often used to develop in periods of heavy freight business was largely due to the movement of many cars loaded with freight which originated in and were destined to industrial plants within the switching district. It was impracticable and impossible to fix rates high enough to make this purely switching service pay. The Chicago terminal superintendent of a large railway recently called attention to the fact that the use of motor trucks has largely relieved the railways of the necessity of rendering this expensive and unprofitable service, and that this is an important reason why such serious congestions no longer develop in the Chicago switching district in periods of heavy freight movement. The motor truck is similarly relieving the railways of unprofitable and obstructive switching business in industrial centers throughout the country.

Apparently the number of railway officers is increasing who believe that motor truck lines operating under the control of or in co-ordination with the railways at reasonable rates would make it possible to so collect and deliver freight as to reduce congestion about freight houses and team tracks and on the streets leading to them and thus benefit both railways and public. The motor truck is rendering a valuable service to the railways and the public by relieving the railways of large amounts of freight which otherwise would move by rail from large centers of population and industry for distances of less than fifty miles. It would appear that the railways might, in many cases, use motor buses and trucks as auxiliaries in rendering passenger and freight service to points not reached by their lines in ways that would make them valuable feeders to the rail lines, and also as substitutes for present unprofitable local train service.

It is by no means inconceivable that the railways in a comparatively few years will be owning and operating large fleets of motor buses and trucks in all parts of the country, but first they will want to know more than they do now about the possibilities and advantages of motor transport, and especially about what principles of regulation and taxation are to be applied and what effects their application probably will have.

Books and Articles of Special Interest to Railroaders

(Compiled by Elizabeth Cullen, Reference Librarian, Bureau of Railway Economics, Washington, D. C.)

Books and Pamphlets

Annual Report of the Secretary of the Interior for the Fiscal Year Ended June 30, 1925. "Alaska Railroad," p. 24-25, 55-60, 119-121, with map, p. 56. 122 p. Pub. by Govt. Print. Off., Washington, D. C. 20 cents.

Canada. Annual Report of the Department of Railways and Canals for the Fiscal Year from April 1, 1924, *to March* 31, 1925. 107 p. Pub. by F. A. Acland, Ottawa, Canada. 25 cents.

Report of the Secretary of Agriculture 1925. "Legislation—Freight Rates," p. 23-24. 97 p. Pub. by Govt. Print Off., Washington, D. C. 10 cents.

The Steel Highway, by Herbert D. Williams. An historical novel of the times of George Stephenson and the first railways. 253 p. Pub. by Readers Library Pub. Co., Ltd., London, Eng. 6 pence.

Periodical Articles

The Influence of the Locomotive Upon the Unity of Our Country, by Clement R. Brown. The Charles T. Main 1925 prize award paper. Mechanical Engineering, December, 1925, p. 1103-1105.

The Renaissance of the Boston & Maine. Article I. A brief history of the system, outlining present experiments and developments. Barron's, Nov. 30, 1925.

Letters to the Editor

Train Accidents or Train Control

HOUSTON, TEX.

TO THE EDITOR:

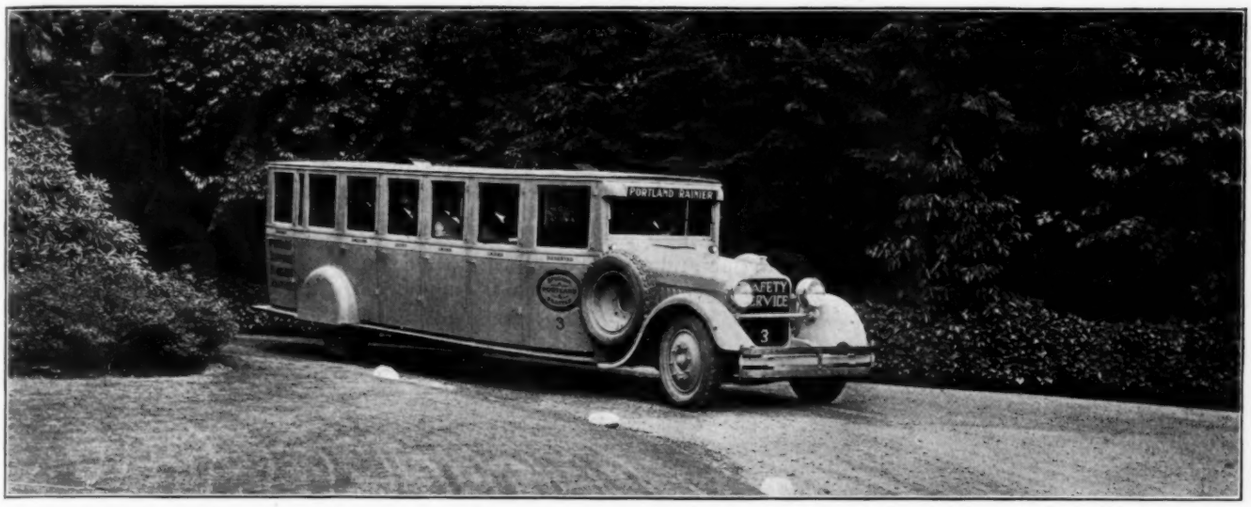
Reading your editorial comment in the issue of November 21, relating to Monmouth Junction collision, would lead one to believe the application of automatic train control would prevent all such accidents, and I believe that this idea is fixed in the minds of many people. It ought to be understood that no such result will be accomplished by the application of automatic train control for the reason that some part of the mechanism will fail at times and, in such instances, results may be more disastrous than under the present system, due to the fact that when a division is equipped with train control there is apt to be less alertness on the part of trainmen and enginemen in looking out for signals.

By this I do not mean to argue against additional safeguards to prevent accidents because we must all recognize the fallibility of mankind. This trait in mankind is the reason that automatic train control will not prevent all accidents. Fallibility cannot create infallibility; therefore, so long as human agency must provide this device, so long there will be occasional failures.

I think also, that a little too much stress is generally placed on railroad accidents by the public. The hundreds of serious automobile accidents daily throughout the country are passed over with comparatively little notice. We have at times, serious gas explosions in cities or collapsed buildings, involving much heavier loss of life than any railroad accidents, but not much attention is paid to them. All of these, as in the case of railroad accidents, are due to failure somewhere of a human agency. I doubt if we have any more reliable actuaries in the country than our insurance companies. These companies write accident insurance and in the event of loss of life as a result of accident, pay twice the face of the policy if loss of life results from accident in a railroad vehicle for the carriage of passengers, indicating that the average citizen is safer on a railroad passenger train than anywhere else.

Such features as I have enumerated should have consideration in the discussion of train accidents and their control and prevention. All of the railroads are much interested in automatic train control and many of them have spent large sums of money installing such devices. Much more would be spent and additional devices applied if the railroads had approval from the Interstate Commerce Commission of devices now installed.

W. R. SCOTT,
President, Southern Pacific Lines in Texas and Louisiana.

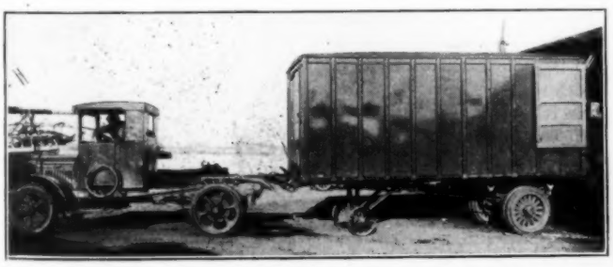


The Spokane, Portland & Seattle Supplements Its Rail Service with 30 of These Buses

Meeting the Competition of Buses and Trucks

Tendency toward adoption of highway carriers by the railroads themselves is growing

IN an article in last week's *Railway Age,* the extent of highway competition and its effect upon the revenues of the railways, was described. From the facts shown, the conclusion appears justified that the buses and trucks are here to stay. It naturally follows, then, to ask, What are the railways going to do about them? The measures they have adopted to meet this highway



A Truck in Service for the Boston & Maine Picking Up a Loaded Trailer

form of competition have taken five forms, not counting the policy of ignoring the whole business. These are: (1) adding to existing railway passenger service; (2) opposing applications of bus and truck operators for permission to do business as common carriers; (3) organizing excursions; (4) operating rail motor coaches on the rails; and (5) themselves engaging in bus or truck operation.

The first method, supplementing the existing service with additional trains, while contrary to the general trend toward a reduction in railway passenger service, has nevertheless been vigorously adopted by several of the largest systems. These have been moved to increase their service on the rails by the belief that the popularity of the buses has proved that the railways in the past have paid too little attention to the provision of the most complete passenger service to their patrons. The belief exists among the officers of these roads that the railways can successfully combat motor bus competition without leaving their rails. At least one road has found this plan successful, in a measure at least. During the past year it has put on a number of new trains where they were justified economically, and has persistently and extensively advertised its service. The result has been that its passenger earnings this year are not continuing to decline but are equalling those of last year.

The second method of combating highway competition

The New Haven, Through Its Subsidiary, the New England Transportation Company, Operates a Fleet of These Buses

is the opposition of applications of bus and truck companies for certificates of convenience and necessity to operate as common carriers. Such efforts, of course, are confined to the 31 states that have laws regulating the traffic on their highways. The attitude of the railways generally toward their highway competitors and particularly toward the truck lines, is expressed by the vice-

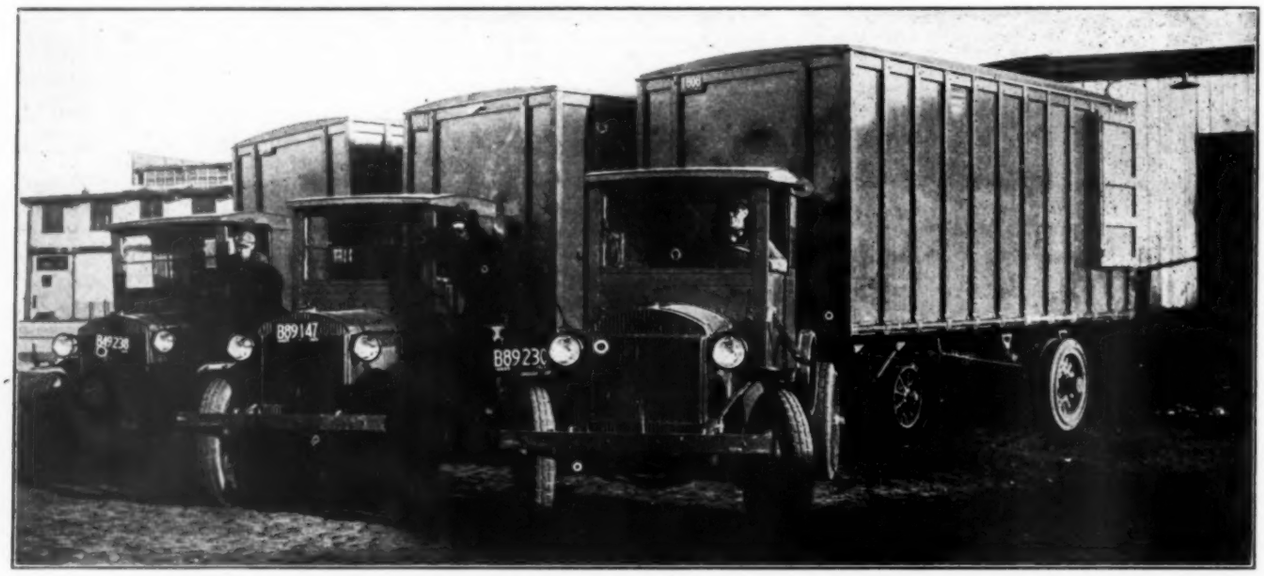
president of a northwestern road as follows: "We will go before the commission to oppose every freight truck line which attempts to parallel our tracks. This form of service is a substitution for our railroad service. Truck lines do not create new business but take business from the railroads. The law recognizes the railroad as a necessity. Therefore we believe that we should have all of the business. If we do not, the aggregate of inroads from truck lines will mean higher freight rates sooner or later. The railroads carry all the freight and must have all of it if there is not to be an increase in operating costs and in rates."

In spite of the strong arguments of the railways, their efforts to shut out highway competitors have not been very successful. In the first place, the state commissions, while sympathetic to the railroads and outspokenly anxious to protect their revenues, are strongly inclined to heed the public outcry to let the buses and trucks run. The public's attitude seems to be that it does not love the railroads less, but loves the highway carriers more. To be sure, some states, notably Illinois and Iowa, have consistently held that where the railway service is sufficient the railways should not be harassed by competitors operating on the highways. But such states having laws regulating bus and truck operation are the exception rather than the rule and in states without such laws, of course, the competition is unbridled. Injunctions have helped the railroads some, as has occasional labor union intervention. But the fact remains that in general the fight to keep the buses and trucks from operating has been a losing one.

Closely connected with the railways' efforts to place legal restrictions upon highway competition are their attempts to curtail their service, but these have likewise been largely unsuccessful. The Boston & Maine, in particular, advocates the abandonment of a large part of its rail mileage. The Interstate Commerce Commission has granted authority for such abandonment in some cases but has ordered the continuance of operation in more. Railway freight service can be reduced or eliminated without causing too much complaint, but the elimination of the local passenger train which goes up in the morning and comes back in the afternoon, is a vital matter which assures a full house at a commission's hearings on the proposal. Unlike the regulation of the highway carriers, regulation of the railways is thoroughgoing and they cannot remove their trains at will without the approval of the state and national regulatory bodies. Consequently, the railroads' plea that they are operating their trains at a loss and the business they do does not justify them, usually meets only with sympathy and a negative decision.

Excursions Are Growing Popular

To offset the drain on revenues due to highway competition, a number of the railways operated excursion trains at very low rates last summer with results ranging from poor to excellent. This type of business is good business and the railways have found that they can well afford to consider its adoption. On the other hand, there should be no misunderstanding about the traffic these excursions bring. It is not the traffic which the railways have lost to the motor buses. It is, to a very large extent, created traffic and if it is taken from anyone, it is taken from the private automobiles rather than the public carriers.



Three Trucks and Trailers Are Owned by Stone's Express, Inc., the Contractor Who Operates the Trucking Service of the Boston & Maine

Rail Motor Coaches Offer One Solution

The replacement of local passenger trains, particularly on branch lines, with rail motor coaches, is becoming increasingly popular. More and more railways are adopting them on their branch lines where traffic is so light as to render the operation of full trains unnecessary and costly. The many recent improvements in the design and efficency of the rail motor coaches have been largely responsible for their spreading use.

The National Automobile Chamber of Commerce lists 190 railways which are now using gasoline and gas-electric rail motor coaches. While most of these are short lines, the list includes such Class I carriers as the Santa Fe, the Baltimore & Ohio, the Boston & Maine, the Chicago & North Western, the Big Four, the Burlington, the Canadian Pacific, the Rock Island, the Chicago Great Western, the St. Paul, the Canadian National, the Erie, the Great Northern, the Illinois Central, the Louisville & Nashville, the Lehigh Valley, the Missouri-Kansas-Texas, the Soo Line, the Missouri Pacific, the Northern Pacific, the New Haven, the New York Central,

the Pennsylvania, the Reading, the Southern Pacific, the Southern, the Seaboard Air Line, the Union Pacific, the Western Pacific and the Wabash. These roads operate from 1 to 45 rail motor coach units, the Big Four having 12, the Great Western having 13, the Canadian National 11, the Erie 10, the Northern Pacific 10, the New Haven 25, the Pennsylvania 12, the Southern Pacific 23, the St. Louis-San Francisco 10, and the Union Pacific 45.

In ability to handle all the traffic offered in sparsely settled regions at a low cost, rail motor coaches seem to offer a very definite answer to the highway carriers' challenge. On branch lines, particularly, where freight traffic is not so heavy as to render their frequent operation an obstruction on the line, they can probably provide a frequent service and a comfortable service more economically, considering the cost of operation only, than can the highway carriers.

Railway Operation of Highway Carriers

The fifth method by which some of the railroads are meeting highway competition is the establishment of bus and truck service on their own part, usually through the organization of subsidiaries. This is the method which has aroused the most discussion and argument. Shall the railways operate buses and trucks? If it is demonstrable that the railways, in using buses, can replace certain of their passenger trains, thus cutting down the cost of providing passenger service, while rendering as frequent or a more frequent service, and in using trucks can provide a better short haul and terminal service more cheaply, the answer is, "Yes."

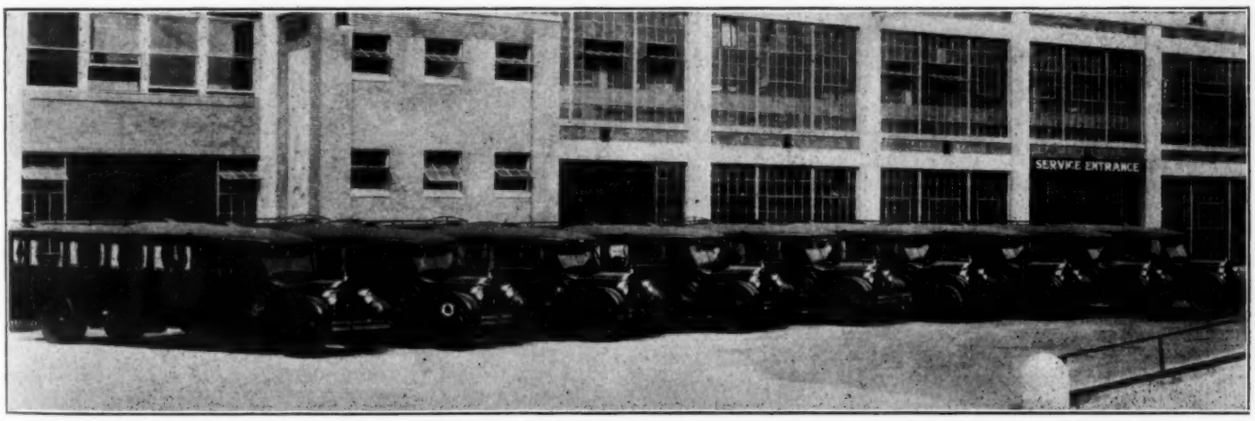
Railway executives have voiced a number of objections to the suggestion that the railways enter the highway transportation field. Some of them claim that the railways do not have the organization to enter into such business. There are other union labor and charter objections which would obstruct operation on the highways by the railways themselves, although the latter objection is being met by the establishment of subsidiary companies designed to operate on the highways. This action would seem to meet also the objection that the railways lack the organization to enter the highway transportation field. Some argue, too, that the buses themselves will soon feel the effect of the spreading use of the private motor car. The assertion is also made that buses would bring back no business to the railroads, and if no rail service is eliminated by them their operation would only increase the cost of providing service without correspondingly increasing revenues. Aside from these, the most frequent objection to the railways entering the highway field is the belief that the railways should stick to their rails.

On the other hand, there are strong arguments in favor of the railways operating buses and trucks. There is no question but that the public likes the buses and has shown a preference for buses operated by the well-established carriers rather than irresponsible independents. The same preference has been shown time after time by the state regulatory bodies. The public, therefore, seems to say that the railways should operate buses.

Is this desirable from the railways' standpoint? The belief exists among a growing number of railroad men that insofar as the use of motor buses by the railways as feeders is concerned, it is. But should the railways parallel their rails with bus lines if traffic on the rails is not heavy? The experience of a western line which has an electric subsidiary throws an interesting light upon this question. It has found that, omitting consideration of the investment charge, the railways can provide service on their rails in general as cheaply as they could by operating on the highways, even in the present state of low taxation of the highway carriers. An officer of this road says, "The experience of our subsidiary shows that motor coach service is more costly than electric railway service where the volume of travel is sufficient for rail service and that as compared with motor coach service, the investment charge for rail service determines what form of transportation should be established. When electric railway facilities are in an operating condition and where the routes of the rails properly serve the communities, there is nothing to be gained by the substitution of motor coach service for electric rail service." If this is accepted, it appears that the railways should continue to use their rights of way by means of reduced steam train service or rail motor coach service. Of course, if traffic over the line is heavy, and the operation of frequent trains such as the public demands, is impossible, the use of buses on the highways supplementing the railway service would appear to be more advisable.

Extensive use, however, can be made of the motor buses as feeders to the main line. This might be done even at a loss in the accounts of the motor bus subsidiary since in specific instances the increased new business which has been brought to the rails has more than justified the deficit incurred in the motor operations. The use of motor buses as feeders to the rail lines, a number of officers believe, offers an opportunity to the railways to better their service to the public at a profit, or at least at no greater loss to themselves.

A very important argument in favor of the railways operating their own buses lies in the fact that bus operation has a tendency to eliminate from the field revenue-sapping, independent operators of buses. Such has been



Part of the Large Fleet of Buses Operated by the New Haven Through a Subsidiary, the New England Transportation Company

the experience of many electric lines which have adopted the use of the highway vehicles. The experience of the Chicago, North Shore & Milwaukee, an electric line operating between Chicago and Milwaukee, Wis., is a case in point. The motor bus service of this line was described in the *Railway Age* of August 16, 1924, page 75. As stated in that article, the North Shore Line operates several bus routes, some extending into territory far removed from its electric line and others paralleling the electric line at a little distance, so that both kinds are really feeders. As stated in the article referred to, the officers of the road feel that the operation of the buses

Boston & Maine Buses, Used to Replace or Supplement Rail Service, Scheduled to Connect with Through Trains

is profitable to the company in many ways in spite of the fact that its bus operations have annually incurred a loss to the company. It is noteworthy, however, that this loss has decreased considerably each year. The officers feel that their bus operations are justified because of the considerable amount of passengers business brought to the main line which would otherwise fail to reach it.

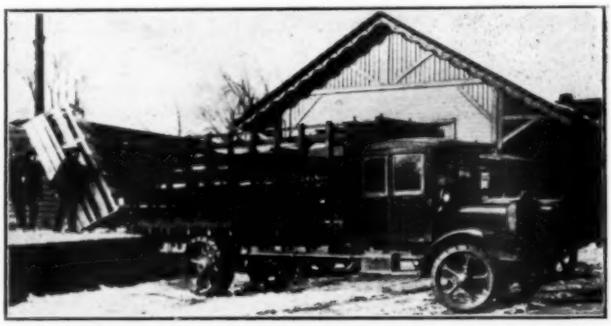
Through their more frequent and better service, the buses have been directly instrumental in developing traffic where very little existed before. Furthermore, the buses have served as an advertisement for the company and, in reaching out into new territory remote from the rails, have secured many new patrons for the main line. By supplementing its main line service to the benefit of its patrons in its own territory, the North Shore Line has also done constructive work in securing the hearty good will of the citizens of the territory it serves. And probably most important of all, it has kept out the horde of small bus owners who would otherwise be constantly springing up. The experience of the North Shore Line is that these small operators rarely last for a long time, yet during their existence they cut into railway revenues to no inconsiderable extent. By operating its own buses even at a small loss, the North Shore Line feels that it has saved itself many thousands of dollars in passenger revenue which otherwise would have been lost.

Motor trucks are usable in two ways. They can be used in l.c.l. service over long or short hauls or they can be used at terminals and to provide a store door delivery service. Objections to the use of the motor truck by the railways are on three points: (1) because it might result in a reduction in through rates if the sum of the locals were less; (2) the objection to the railways themselves undertaking a system of store door delivery which they could not furnish for a part of their package freight while denying it to other parts, and which is not universally demanded by shippers; and (3) the general belief that the railways should stick to their rails.

Those who favor the use of motor trucks by the railways do so in general for the same reason that the operation of buses by the railways is favored. The principal railway proponents of its adoption suggest the use of motor trucks as part of the railroad service in place of way freights out of the larger terminals and in transshipping freight from parallel branch lines across country to main line stations. They also suggest the use of trucks in handling freight from the larger concentration points to the smaller delivering stations. In this connection, the handling by trucks of unit containers for l.c.l. merchandise and carload bulk freight has been developed to a satisfactory stage.

Bus and Truck Already Adopted by Some Roads

The number of railroads now operating buses and trucks directly or through subsidiaries is large and growing. The use of trucks for freight haulage is more common than the use of buses, the latter in fact being still in its infancy. In this connection it may be stated that the use of motor buses and trucks by the railways is being carried out in very nearly all instances through companies subsidiary to the railway companies themselves. Especially is this true of the larger bus operators. This is advisable by reason of the fact that a separate highway transportation organization can be trained and developed to a higher efficiency than would be obtainable through the operating departments which have also to do with operations on the rails. In certain instances, on the Boston & Maine, for example, trainmasters and dispatchers co-operate with the officers of the bus subsidiary in supervising their operations with resultant savings in administration expenses. This practice, which may be found advisable in many cases, does not, however, ignore the fact that highway transportation is a highly specialized business requiring specialized knowledge and training, and this can best be provided by separate bus and truck organizations. There are other considerations such as labor agreements and charter restrictions, which render this use of the subsidiary necessary.



Trucks Used by the Pennsylvania to Replace Local Freight Trains in Handling L. C. L. Freight. Truck Operations Are Carried on Under Contract with a Trucking Company

It is significant, also, that most of the railways providing trucking service do so through contracts with established trucking companies. In fact, it may be said that this is the rule rather than the exception. There are certain obvious advantages to be gained by permitting trucking concerns with long experience in the business to carry on the operations for the railways while remaining definitely under their control. The trucking companies operating under such contracts are in effect parts of the railway organizations but they are free to exercise their own initiative in increasing the efficiency of their operations.

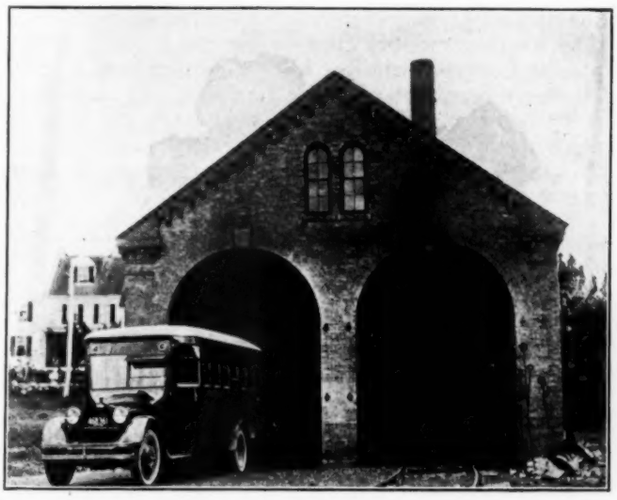
There are 21 railroads which now use trucks for various

purposes. Of these, the Boston & Albany, the Lehigh Valley, the Erie, the New York Central, the Pennsylvania, the Boston & Maine, the Delaware, Lackawanna & Western, the Great Northern, the Maine Central, the New York, New Haven & Hartford and the Southern Pacific, either with their own trucks or with the trucks of contractors, provide trucking service in terminal movements. It should be noted also that all the railways entering St. Louis and all those entering Cincinnati, O., in effect provide a trucking service in their terminal transfer through the union trucking organizations which have operated in those cities for a number of years. The Buffalo, Rochester & Pittsburgh, the Lehigh Valley, the Baltimore & Ohio, the New York Central, the Pennsylvania, the Long Island, and the New York, Ontario & Western use trucks to replace local freight trains. They are made use of in providing store door delivery by the Canadian National, the Lehigh Valley, the Erie, the Boston & Maine, the Delaware, Lackawanna & Western, and the Maine Central.

The Maine Central, with its own trucks, covers two routes of a total length of 91 miles. The Lehigh Valley also is operating motor trucks in local freight service for a distance of 161 miles and says, "This has proved most satisfactory to our patrons, and while it does not bring us a profit it serves to reduce our losses as compared with steam train operation." In the New York district, the Pennsylvania, the Delaware, Lackawanna & Western, the Lehigh Valley and the New York Central are handling some of their lighterage business by motor truck.

The Pennsylvania is making a very extensive use of motor trucks under a contract with an old established trucking company. The trucks are used in the replacement of way freight locals for the concentration and distribution of freight within terminal areas and for interchange and inter-line freight. The utilization of the motor truck in freight service by this company was described in detail in the *Railway Age* of February 2, 1924, page 319. Further description of the truck operations of this road was published in the *Railway Age* of November 21, 1925, page 944. In the latter, an address by Joseph L. Scott of Scott Brothers, the trucking firm which handles the Pennsylvania's trucking business under contract, it was pointed out that the trucks now give uninterrupted daily service to 469 towns in the states of Maryland, Pennsylvania, New Jersey and Delaware, and cover 1,348 miles daily. In a number of cases, he said, this has expedited delivery from 24 to 48 hours. The cost per ton mile, according to Mr. Scott, varies from 3 to 10 cents, due to the difference in territories covered. The Scott Brothers' trucks cover more than a dozen separate portions of the Pennsylvania's lines. In addition, the Pennsylvania has contracted with two Indiana trucking companies for the establishment of local freight service by trucks between Fort Wayne, Ind., and Lima, O., a distance of 70 miles. The Pennsylvania has found that its use of trucks has materially reduced the cost of providing l.c.l. freight service between local points, and has also expedited the movement of freight over its own line and in deliveries to connecting lines.

The New York Central, through contracts with trucking companies, handles l.c.l. freight by motor truck along its entire line from Buffalo, N. Y., to Toledo, O. Its subsidiary, the Michigan Central, also uses trucks in the same way over a portion of its line. This truck service is primarily divisional in character. The plan on the New York Central provides for handling l.c.l. freight from terminals to the freight houses at stations on divisions by means of the motor truck. These trucks are operated on a regular daily-except-Sunday schedule, starting from the main division terminal with a view to providing early first morning delivery at local freight stations of l.c.l. freight originating at main distributing points providing a similar service to the producer by movement of products to local market centers. In using trucks as substitutes for unprofitable local freight service on the rails, the New York Central has materially reduced the cost of rendering this necessary service. Its trucks are not being used to make local collections and deliveries in competition with common carriers on the highways, however, since they operate only between specified railroad stations.



Enginehouse at Ashburnham, Mass., Converted to Bus Garage by the B. & M.

The North Shore Line Has Been a Pioneer in the Use of Buses

Great Northern Bus Plan

The Great Northern will have one of the largest systems of bus lines in the United States when its plan is put into effect. Through a subsidiary, the Northland Transportation Company, into which it has merged six separate

independent companies, 140 motor buses will be operated on schedule routes covering more than 2,000 miles of Minnesota highway, centering around Minneapolis and St. Paul, and around Duluth, Minn. The buses will cover 13 separate routes. Connections will be made with other existing bus lines and a system of interchangeable tickets for passage over combined bus and rail routes is planned. Some of the buses will operate parallel with the railroads but the majority will be more adapted to service as feeders. A large terminal garage is now under construction in Minneapolis.

The Reading recently incorporated the Reading Transportation Company which will operate buses over a group of routes throughout its entire territory. In co-ordinating its motor coach service with rail service the Reading will eliminate 164,315 passenger train miles annually and add 265,647 motor bus miles. This represents a large increase in the frequency of service. The application of the Reading to discontinue some of its train operation and replace it with bus operation is now pending before the Pennsylvania Public Service Commission.

The Boston & Maine, through a subsidiary, the Boston & Maine Transportation Company, is making use of buses in all manner of service in the regions covered by its lines. The work being done by this company was described in the *Railway Age* (Nov. 21, page 941). As stated in that article, the Boston & Maine Transportation Company is operating a motor coach line parallel to the railway between Boston, Mass., and Portland, Me., in each direction, in competition with three other bus lines. It is also operating motor coach service between Boston and the White Mountains in each direction. Other bus routes are operated between Franklyn, N. H., and Bristol, between Concord, N. H., and Newport, between Plymouth, N. H., and Lincoln, and between Lynnfield, Mass., and Wakefield. The Boston & Maine has established its bus routes largely as experiments to determine the uses to which buses can best be put. Thus some of the routes supplement rail service which is continued, others are designed to replace rail service entirely, and others are feeders to the main line. As stated before, the Boston & Maine hopes ultimately to replace a very large amount of its branch line railroad service by service on the highways.

H. F. Fritch, president of the Boston & Maine Transportation Company, summarizes the conclusions which they have reached as follows: "The railroads, in order to strengthen themselves and increase their ability to provide good main line service at the lowest possible cost, must make use of the motor vehicle to supplant and replace rail service where the motor can perform the service more economically. Such a policy is to the advantage of both the communities served and the railroad. The railroad, as well as other bus operators, should work conscientiously with the bus manufacturers to promote standardization of construction to their mutual benefit. Any improvement of the motor bus along the line of economy in maintenance and operation will assist the railroads in serving those of their communities which it is becoming increasingly difficult to serve by rail on account of their light traffic. I predict that the railroads will make large use of the motor bus."

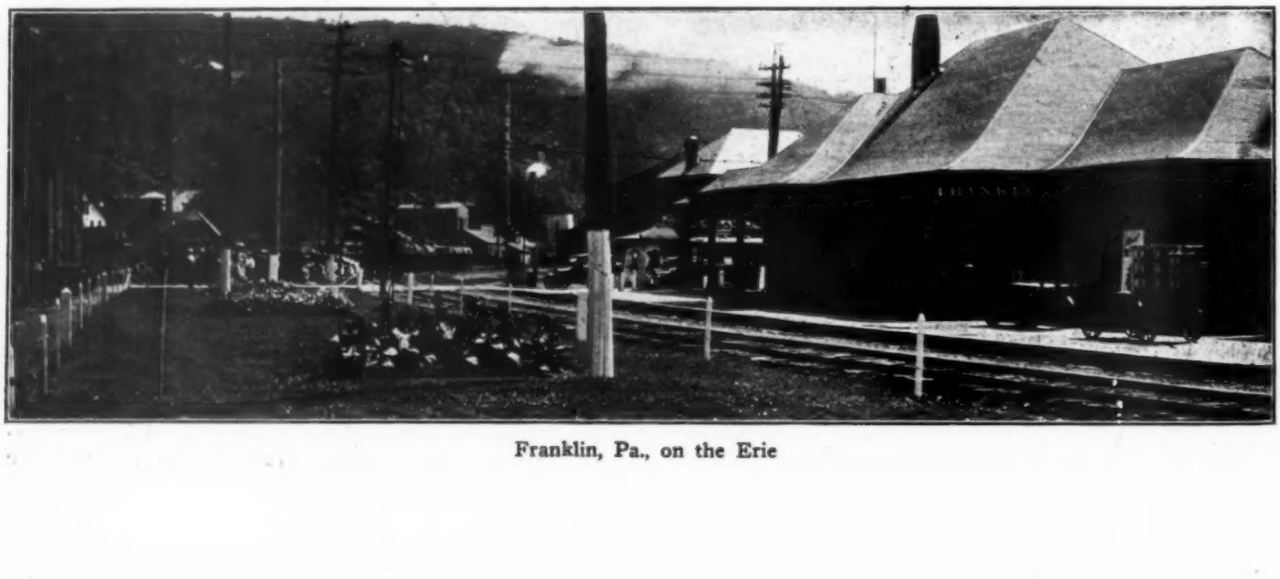
The bus and truck operations of the New Haven, through its subsidiary, the New England Transportation Company were described in the *Railway Age* of December 5. The New Haven plan is very similar to that of the Boston & Maine.

The Spokane, Portland & Seattle, organized a subsidiary, the Spokane, Portland & Seattle Transportation Company, more than two years ago. This company has the distinction of being the first steam railroad to adopt the motor bus, the Boston & Maine being the first in the east. The S., P & S. subsidiary took over a competitor operating between Portland, Ore., and Seaside. The highways used by the S., P. & S. buses between Portland and Seattle parallel the railway line for almost the entire distance. The buses are used to supplement the train service. The S., P. & S. also provides bus service from Portland to Mount Rainier. In the east, one other road, the Maine Central, uses buses. This road has two buses covering one route of 47 miles and another of 44 miles.

In addition to the roads whose bus operations have been described in more or less detail, the following roads now make use of one or more buses: the Canadian Pacific, the Chicago, Milwaukee & St. Paul, the Colorado & Southern, the Gulf, Mobile & Northern, the Missouri-Kansas-Texas, the Quebec, Montreal & Southern, the Tama & Toledo, the Union Pacific, which operates a number of buses in Zion National Park, Utah, and several smaller roads.

The adoption of buses by steam railways is a very recent development. Railroad bus service is as yet hardly a year old. In spite of its newness, however, the bus development is assuming very noticeable proportions and gives promise of being further augmented in the near future.

The use of trucks by the railroads is less new but is likewise growing as the knowledge of their adaptability to railroad use spreads. The future of bus and truck transportation and its effect upon the railways and their operations is a subject being given the closest attention by railway officers.



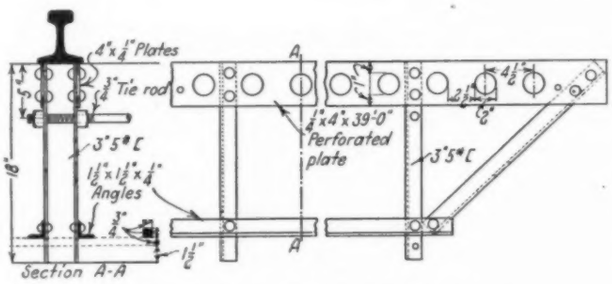
Franklin, Pa., on the Erie

A Design for Permanent Track Construction

Reinforced concrete slab shows estimated return of more than 10 per cent on its cost

By Frank H. Alfred and Paul Chipman*

THE type of track now in use by the railroads was evolved very early in their history and has been retained ever since without essential change. To keep pace with the increase in the weight of equipment and the volume of traffic, heavier rails with stronger fastenings of improved pattern have been used, the depth of the ballast has been increased, and the ties have been placed closer together; but the general arrangement is still the same. On account of its adaptability to the varying conditions incident to the growth of the railway system, such as an unseasoned roadbed and frequent changes in line and grade, no other type of track could have served the purpose as well, on the score of either efficiency or economy.



Typical Details of the Longitudinal Frame

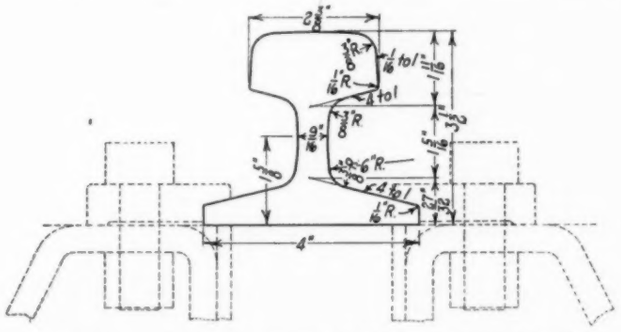
But on most of the railroads in this country a different set of conditions is now encountered. Traffic routes have become fixed. Few changes of line or grade which involve any considerable mileage are contemplated. Embankments have become seasoned and, for the most part, show no further settlement. Wheel loads are approaching the maximum which is permissible, unless steel rails can be made both harder and tougher than at present. The increasing cost of ties is only partially offset by the longer life obtained by treatment. Suitable ballast is increasingly more expensive and track labor is becoming scarcer and, measured in performance, more costly.

A More Permanent Track is Desirable

Altered conditions in highway traffic were promptly met by the development of a new type of pavement. Likewise the street railways rapidly developed types of track structures which are well adapted to their peculiar conditions. The time has now arrived when careful consideration should be given by the railroads to the development of a type of track which is more suitable to present conditions on heavy traffic lines. Some pioneer work has been done along this line, both as to suggested design and actual construction, experimental or otherwise. Of the former, J. W. Schaub's contributions on the subject as long ago as 1907 are notable. (See *Railway Age* of May 31, 1907, page 835, and Railroad Age Gazette of November 27, 1908, page 1431.) In 1919 A. C. Irwin described a number of such types of track in a paper before the American Concrete Institute. The principal cases of actual construction carried out up to the time of its publication are described in Volume 21 of the Proceedings of the American Railway Engineering Association for 1920.

Such an installation, even on an experimental scale, is necessarily expensive; and before such expense is incurred it is desirable not only to profit by past experience, but also to consider such suggestions as may be offered by all who are interested. This article is written in the hope that the design of track herewith submitted and the estimate of the savings which would result from its use will stimulate interest in this matter and will bring forth constructive criticism which will not only result in the improvement of the design, but will also throw more light on the economic value of a track of this type. Comments on the part of those who have had experience in regard to track of the permanent type on either railroads or street railways will be especially welcome.

By permanent track is meant a track structure in which wear and deterioration are confined as far as possible to the rail. The requirements for such a track structure are most exacting,—so much so that in certain situations they cannot all be met with the design here submitted, although it is not unlikely that a type of structure can be developed which would meet even these severe requirements. Such conditions include fills that are not fully settled, fills over sink holes or over ground filled with water which may be removed subsequently by drainage, soils of such texture that freedom from heaving by frost cannot be secured by thorough drainage, and places where changes in connections with side tracks are frequent. However, on old lines these situations comprise only a small fraction of the total, and their existence need not interfere with the use of permanent track on the remainder, if such use is advantageous.



A Suggested Design of Rail for Use on Concrete Slabs

Such a structure must be wide enough and strong

* The president and general manager and the office engineer, respectively, of the Pere Marquette, Detroit, Mich.

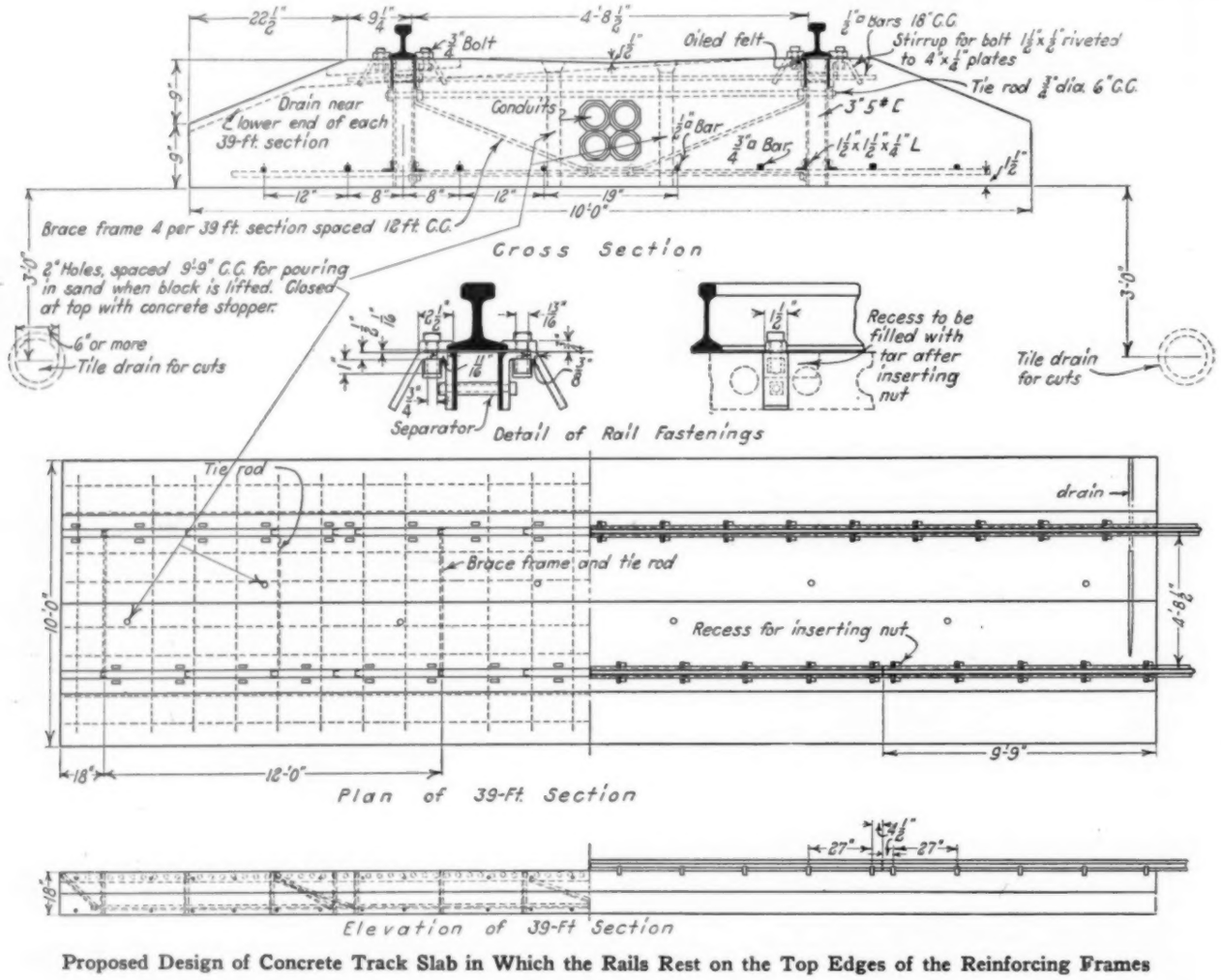
enough to distribute the load over such an area that the bearing power of the sub-grade will not be exceeded. Allowance must be made for impact, for lack of uniformity in the support given by the sub-grade, and for the present tendency toward heavier loading. Temperature stresses must be taken into consideration; and protection of the concrete under the rail from disintegration due to repeated shock from the passing loads seems desirable, although trial may prove this feature not to be essential.

The method of attaching the rail should permit of its easy placing and removal. Methods and type of construction must be such that the rail, when laid in its prepared place, will have perfect surface and alinement. However, the design should be such as to permit minor adjustment of elevation by shimming, as occasional slight settlement may be looked for even in seasoned fills, and changes in traffic conditions may make a change in the super-elevation of curves desirable. Ease of insulation is another feature that must not be overlooked. As there will be occasional situations where it will be desirable to retain the present type of track, any design should permit an easy and practicable connection of the two types of construction.

These features have all been considered in the design submitted herewith. The supporting slab of concrete is 10 ft. wide and 18 in. thick. Assuming the use of 39-ft. rails, the concrete would be cast in sections of that length. The rail rests on the edges of two plates which are embedded in the concrete, and are perforated in order to provide better bond and more bearing on the concrete. These serve a fourfold purpose: (1) To distribute the load and impact over a greater area of concrete; (2) to protect the concrete from shock and possible disintegration due to direct contact with the rail; (3) to afford a means of attaching the rail; and (4) to insure a setting for the rail which is absolutely true as to line and surface. In addition, they form a guide for striking off the concrete surface in finishing.

A Truss Reinforcement is Employed

The plates which form the rail seat also form the upper chord of a light truss, the lower chord of which serves as a part of the longitudinal reinforcement. The vertical members of this truss serve to anchor the rail seat to the concrete, and are extended below the lower chord, so that they may rest upon stakes driven accurately to the elevation of the sub-grade. This truss would be shop-made, and the bracing and riveting need only be of sufficient strength to prevent distortion while handling. When set in place, these trusses are connected by adjustable tie rods spaced 6 ft. apart, and also by the brace frames shown on the drawing. Four of these brace frames are used for each 39 ft. section. One of the tie rods forms the upper member of the brace frame. This arrangement gives a rigid framework which can be set accurately in place and will remain undisturbed while


Bolt
Oiled felt
Stirrup for bolt
Tie rod
Drain near lower end of each 39-ft. section
Conduits
Brace frame 4 per 39 ft. section spaced 18 ft. C.C.
Cross Section
2" Holes, spaced 9'-9" C.C. for pouring in sand when block is lifted. Closed at top with concrete stopper.
6" or more
Tile drain for cuts
Recess to be filled with tar after inserting nut
Separator
Detail of Rail Fastenings
Tie rod
drain
Brace frame and tie rod
Recess for inserting nut
Plan of 39-Ft. Section
Elevation of 39-Ft. Section

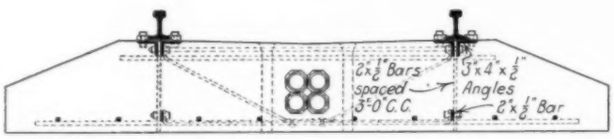
Proposed Design of Concrete Track Slab in Which the Rails Rest on the Top Edges of the Reinforcing Frames

the concrete is being placed. It will also serve to transmit the loads into the mass of concrete.

Longitudinal reinforcement consists of four ¾ in. bars and four ½ in. bars in addition to the two 1½ in. by 1½ in. by ¼ in. angles which constitute the lower members of the trusses. The ratio of longitudinal reinforcing metal is about 0.37 per cent. Assuming a Cooper E-70 loading concentrated under the axle, with 50 per cent allowance for impact and uniform bearing on the sub-grade, the tensile stress in the steel would be about 9,000 lb. per sq. in. and the compressive stress in concrete would be about 200 lb. per sq. in.

Transverse reinforcement consists of ¾ in. square bars spaced 18 in. center to center near the base of the slab, and ½ in. square bars spaced 18 in. center to center near the top of the slab. Where brace frames and tie rods occur, other transverse reinforcement is omitted. Assuming the 70,000 lb. on a pair of drivers to be uniformly distributed over a longitudinal distance of five feet, and again assuming an impact allowance of 50 per cent and that the upward pressure of the sub-grade is uniformly distributed, we obtain a unit tensile stress of 14,000 lb. for the steel and a unit compressive stress of about 300 lb. for the concrete.

These unit stresses are ample to take care of any increase in future loads, impact and unequal subgrade conditions. On account of the greater length of the section as compared with its width and the consequent opportunity for more variability in the condition of the subgrade it is thought desirable to use a much lower unit stress for the



Alternative Design in Which the Rail Is Supported on a Pair of Angles

longitudinal reinforcement than for the transverse. With modern methods of proportioning and making concrete the maximum of economy may be obtained through designing the concrete to meet the actual condition of stresses disclosed through experience in the use of this type of roadbed. It might seem that some economy in design could be attained by not using so thick a slab and using a higher percentage of reinforcement. On account of the impact however, it is believed that the additional mass obtained by using a greater thickness is well worth its additional cost.

In order to facilitate construction the concrete slab should be poured continuously, and not in alternate sections. A metal separator would be placed at the end of the section being poured. After the adjoining section had also been poured this separator would be removed. It is not planned to leave any well-defined joints between the sections, on the assumption that compression due to high temperature would easily be taken care of by the concrete, the thickness of which would prevent any tendency to buckle; and that tensile stresses would cause a cleavage at the end of each section, inasmuch as none of the longitudinal metal is continuous. When these joints develop, they should be filled with tar, as is now done with concrete highways. In construction, the removal of the separator would be delayed until at least a portion of the block ahead of it was poured, thus giving the block behind it a start toward setting and insuring a cleavage practically along the plane of the separator.

The rail is held by rail-clips, which are attached by bolts to stirrups bolted to the perforated plates and embedded in the concrete. The bolt is placed with the head up and screwed into a nut which is inserted beneath the stirrup through a recess provided for that purpose. This recess is only slightly wider than the nut, thus preventing it from turning. This arrangement tends to lessen the danger of injury to the bolts in case of derailment, and permits their replacement if injury should occur, or the substitution of a longer bolt in case slight shimming is desirable. Nutlocks can be used under the bolt head if desired. No angle bars or fish plates are necessary, as the rail seat and rail attachments serve their purpose.

Secondary Considerations

With such a design, the rail no longer functions as a beam. A wearing surface and a base for bearing and attachment are all that need be provided, so that a much lighter rail may be used than at present. A suggested design for a 60-lb. rail is therefore shown, which it is believed would be fully as effective as a 130-lb. rail under present conditions.

Rail anchors would not be needed. It is possible that creeping of rail could be avoided by keeping the bolts near the center of the rail tighter than those at the end. If this did not prove satisfactory, the rail could be anchored by one or two bolts near its middle point, thus insuring the expansion and contraction of each rail as a separate unit. If it should prove desirable, which does not appear probable, to give a slight cushioning effect and lessen the impact on the concrete, it is believed that a thin layer of oiled felt beneath the rail would be effective. This felt should be treated with some bituminous mixture in order to preserve it. This mixture should not contain too much tar or asphalt, so that it will not become brittle and break up in cold weather. Perhaps a treatment with crude petroleum would be satisfactory. A layer of felt about ⅛ in. thick, compressing to a thickness of 1/16 in. under the tightening of bolts which hold the rail, and further compressing to perhaps one-half this thickness under an engine load, would probably go far toward reducing the shock upon the concrete beneath the rail-seat. It would also lessen the noise. Insulation between any two sections of track could be accomplished by substituting insulating fiber for the felt. This insulation should extend from the rail joint to the end of the concrete block.

Thorough drainage is essential. On fills made of sand no artificial drainage would be necessary, but on other fills it should be taken care of by tile drains just beyond the edges of the slab, with frequent outlets to the side of the embankment. In cuts the drains should be placed deeper and under the cut ditches, in order to prevent ground water from reaching the track. The proper functioning of these drains is a very important matter and they should be of ample size and have good outlet facilities.

Conduits for carrying all wiring, such as telegraph, telephone, block signals and train control, can be placed in the center of the slab as shown in the cross section, or can be placed elsewhere in the section if desired.

It is not likely that such construction as here proposed would be used to any considerable extent on single track, as its cost would not, in general, be justified by the amount of traffic. Further, to build it on a single track railroad would necessitate the construction of a temporary track to carry traffic around the section of roadbed under improvement. This feature calls for the consideration of pre-cast slabs, to be inserted under traffic. This would seem to be entirely feasible, but it is not likely that as uniform a bearing on the subgrade could be had as if the concrete were moulded in place, which might result in a slight inequality of settlement of the pre-cast sections.

On double track, however, traffic could be diverted to

the track not being improved, without undue expense or serious interruption of traffic. Under such conditions it is probable that the pre-cast section would be more expensive, even taking into account the expense due to traffic interference. It is quite possible however, that in certain situations this would not be the case and the pre-cast method would be more desirable.

An Estimate of the Cost

The cost of a roadbed of this type will vary with the conditions existing at each installation, such as the cost of materials and labor, and the amount of traffic. The following is an estimate of the cost under average conditions, based on the assumption that the railroad company would purchase and deliver all materials and handle the diversion of traffic and that the labor of placing the concrete, including unloading materials, would be done by contract.

Estimated cost per mile of track with a concrete base

Material, furnished by railroad company				
Rail and fastenings				
70-lb. rail, 110 tons	@	$43.00	$4,730	
5,000 rail clips, 3,200 lbs.	@	0.06	192	
5,000 bolts and nuts, 4,000 lbs.	@	0.04	160	
Transportation and storeyard expense, 114 tons	@	2.00	228	
Total rail and fastenings				$5,310
Concrete base, 18 in. thick, 0.5 cu. yd. per lineal foot				
Proportions 1: 2: 4				
Stone or washed gravel, 2,400 cu. yds.	@	1.00	2,400	
Sand, 1,200 cu. yds.	@	0.75	900	
Cement, 4,225 bbl.	@	2.20	9,295	
Structural steel, 176,000 lbs.	@	0.045	7,920	
Reinforcing bars, 105,000 lbs.	@	0.03	3,150	
Transportation (by carrier) 6,400 tons, 100 miles @$0.007 per ton mile			4,480	
Drain tile, 5,280 lin. ft.	@	0.10	528	
Felt, 2,000 sq. ft.	@	0.06	120	
Total for concrete base				28,793
Total material				$34,103
Labor, by contract				
Removing old track			500	
Levelling ballast for sub-grade			500	
Laying tile drain, 5,280 lin. ft.	@	0.10	528	
Unloading materials, mixing, placing concrete and steel, 2,640 cu. yds.	@	3.25	8,580	
Laying rail			750	
Total contract labor				10,858
Engineering				800
Diverting traffic				3,000
Total per mile				$48,761
Estimated cost per mile of rail and accessories in present track that would be retired				
100 lb. rail, 157.14 tons	@	43.00	6,757	
Angle bars, 320 pair, 22,400 lbs.	@	0.03	672	
Bolts, 1,280, 2,900 lbs.	@	0.04	116	
Spikes, 12,000, 7,000 lbs.	@	2.80	196	
Tie plates, 6,000	@	0.25	1,500	
Rail anchors, 1,000	@	0.25	250	
Transportation and store yard expense, 200 tons	@	$2.00	400	
Labor installing			900	
Total per mile			$10,791	
Net cost per mile of track with concrete base				$37,970

The Anticipated Savings

The advantages that would result from a permanent track may be classified as follows:

1. Reduction in the cost of maintenance of way
   a. Ties, eliminated
   b. Ballast, eliminated
   c. Track labor, reduced to rail renewals and track walking
   d. Probably reduced wear on rails and angle bars.
2. Reduction in the cost of maintenance of equipment
3. Reduction in train resistance, resulting in
   a. Less fuel consumed
   b. Greater tonnage per train, with fewer trains; or higher speed, with less train hours.
4. Greater safety, especially at high speeds.
5. More comfort for passengers, due to smoother riding and freedom from dust
6. Advertising value to the early users

The last three items have a value that is very real, although so intangible that it is obviously impossible to estimate it in money. This value would be great for roads having a large volume of high speed passenger business. The passenger traffic of today demands the highest speed compatible with safety, and the same is true of certain classes of freight. In general, track conditions are now the controlling factor in limiting speed. With a track in perfect line and surface, and with no soft spots and low joints, this would cease to be the case, and the high speeds required to compete successfully with other forms of transportation could be maintained.

Following is an estimate of the annual saving resulting from the first three of the above items on a track having a freight traffic of 30,000 gross tons per day and 6 daily passenger trains.

Estimated annual saving, per mile of track

Assume average daily traffic as follows:			
8 tonnage trains of 3,000 tons, 75 cars		24,000 gross tons	
4 less than tonnage trains of 1,500 tons, 40 cars		6,000 gross tons	
Total freight per day		30,000	
6 passenger trains, 8 cars each			
Assume ruling grade of 0.5 per cent			
Maintenance of Way:			
250 ties at $2.00			$500
Ballast renewal every 10 years, 2,000 cu. yds. at $1.50 (material delivered)			300
Track labor			
Present cost, (Acct. 220) for assumed traffic		$1,600	
Less Cost with concrete base			
Labor on sidetracks, 0.5 mile per mile of main	$200		
Renewing rail, 6 year life at $750	125		
Track walking and inspection, 1 man at $1,200 per year covering 6 miles	200		
Miscellaneous labor	200		
Total		725	
Net saving track labor			875
Total saving, maintenance of way			$1,675
Maintenance of equipment:			
Present cost per day			
18 locomotive miles at $0.40			$7.20
760 freight car miles at $0.16			12.16
48 passenger car miles at $0.032			1.54
Total per day			$20.90
		or $7,628	per year
Assuming a reduction of 20 per cent annual saving would be			$1,526
Fuel:			
Assuming a decrease in train resistance of 1 pound per ton, equivalent to a vertical lift of 5280 or 2.64 feet per mile.			
2000			
Total gross tonnage per day			
Freight			30,000
Passenger			1,400
Locomotive			3,600
Total			35,000
Total per year, 12,775,000 gross tons.			
Coal saved per year, 12,775 x 2.64 x 5 lbs. =84 tons.			
Saving per mile per year, 84 tons at $5.00 = $420.			
Increased tonnage rating:			
Present train resistance		6 lbs. per ton	
Grade resistance, 0.5 per cent grade		10 lbs. per ton	
Total		16	
Assuming a decrease in train resistance of 1 lb. per ton, the total resistance would be 15 lb. per ton, and the number of tonnage trains would be reduced by 1/8, or 182 trains per year.			
Cost per train mile, not including fuel:			
Train and engine men	$0.40		
Engine house service	.10		
Train and engine supplies	.10		
Maintenance of locomotive	.40		
Interest on locomotive	.10		
Total	$1.10		
Saving per year, 182 trains at	$1.10		$200
Total saving per mile per year			$3,821
Equals 10 per cent of the estimated cost			

If ruling grades comprise 10 per cent of the division, the application of a permanent roadbed to the ruling grades only would result in a saving per mile due to increased tonnage rating of 10 x $200 or $2,000. Adding the other savings amounting to $3,621, the total saving per mile would be $5,621 or 14.8 per cent of the estimated cost. A similar estimate, based on a freight traffic of 40,000 gross tons per day shows a saving per year per mile of $4,950 or 13 per cent of the estimated cost; and when applied to ruling grades only, of $7,434 or 19.5 per cent.

The several parts of the present track are renewed at comparatively short intervals, and it is therefore proper to deduct from the annual saving as above estimated an amount sufficient to amortize the cost of the concrete base during its probable life. If this life is 50 years or more, this amount is negligible; and if the life is 35 years it is 1 per cent of the first cost, assuming interest at 6 per cent.

In the above estimate the reduction in maintenance of way expense is the only item for which there exists a reliable basis. The figure of $1,600 per mile per year used for the present cost of track labor may seem excessive to one accustomed only to figures representing average costs over an entire railway system or an entire operating division; but when the cost of track labor on the heavy traffic sections is kept separately, it will be found to be much higher than the average. The figure used is based on actual costs on the Pere Marquette, where a comparison of the cost of track labor on the different operating divisions in 1923 and 1924 indicates that such cost is approximately given by the formula:

$$\text{Cost of track labor per mile per year in dollars} = \$275 + \frac{\text{gross tons per year}}{8000}$$

It is assumed that the cost of maintaining equipment would be reduced 20 per cent. This may be either too high or too low, as there is no basis for an estimate; but it is reasonable to suppose that equipment running over a perfectly smooth track would require less repairs and would have a longer life than if subject to the innumerable shocks inherent in operation over the present type of track.

There is likewise no definite basis for the assumption of a reduction in train resistance of one pound per ton. There is doubtless a large amount of energy lost in shocks at rail joints in the present track structure; and, due to the imperfect elasticity of the roadbed, a further amount is lost in depressing the track and pushing the main track wave ahead of the locomotive and smaller ones ahead of each truck. This loss would be practically eliminated with a track of the type proposed, but the decrease in train resistance which would result can only be determined by experiment.

The conclusions to be drawn are that, for roads with heavy traffic, track of the permanent type would result in a reduction of maintenance of way expenses that would yield a moderate return on the investment cost; would probably further result in a large saving in maintenance of equipment and cost of transportation; and would permit the safe operation of trains at considerably higher speeds than are now permissible.

With a moderate return assured on the investment from the saving in maintenance of way expense alone, it would be well worth while for any road with heavy traffic to install one or more experimental sections of permanent track in order to determine its other economic values, and to develop by trial the details of a practical design.

C. & O. Opposes Lease of Virginian to N. & W.

WASHINGTON, D. C.

STRONG opposition to the application of the Norfolk & Western for authority to acquire control of the Virginian was offered by officers of the Chesapeake & Ohio at the hearing before Examiner Davis of the Interstate Commerce Commission. Following cross examination of the witnesses for the applicants, President W. J. Harahan of the C. & O., presented a statement of reasons why the commission should adhere to the allocation of the Virginian to the C. & O., as in its tentative consolidation plan, and said that if the commission should deny the pending application and assign the Virginian to the C. & O., that company or the Nickel Plate will make every reasonable effort to bring about the acquisition and control of the Virginian on terms and conditions that will meet with the approval of the commission. F. M. Whitaker, vice-president in charge of traffic, W. C. Hull, assistant to vice-president, and R. S. Marshall, assistant to the president, also testified, and an adjournment was taken to January 4, when they will be cross-examined. Mr. Harahan said in part:

"If the Virginian Railway is added to the Nickel Plate group it will tend to further improve its ability to serve more efficiently its patrons, because of the greater territory thus effectively reached by lines of rails closely affiliated with it. All of the testimony that I am giving herein is predicated upon definitely providing whatever facilities are necessary in order to take care of the business offered from all sources.

"I am convinced that the public interest unquestionably demands that the Virginian Railway should be combined with the Chesapeake & Ohio and Hocking Valley Railways and not with the Norfolk & Western Railway, thus grouping the Virginian Railway with the proposed Nickel Plate System and not with the Pennsylvania-Norfolk & Western System. The record in the Consolidation case, System No. 8, and the additional facts which will be brought out at this hearing will conclusively demonstrate that in the public interest the Virginian Railway should not be united with the Norfolk & Western and therefore the application of the Norfolk & Western to lease the Virginian for a period of 999 years, now under consideration in this proceeding, should be denied.

"The only coal field that the Virginian Railway serves is the New River low volatile coal district, with the exception of a very small amount of so-called high volatile coal mostly used for company fuel. To serve this coal district to the extent that its operators have a right to demand urgently requires the most efficient and economical outlet obtainable to the west. This was recognized and stressed in the consolidation case and following this thought this commission has recently ordered the establishment of the C. & O. New River district rates from Virginian local mines via Deepwater and Pemberton to western territory in connection with the Chesapeake & Ohio.

If the Virginian is placed with the C. & O. New River district coal from Virginian mines will obtain an outlet to the west, including the Great Lakes, by way of a line of railroad under one operating control, shorter, and more economical of operation than would be the case if the Virginian is placed with the N. & W. system. The N. & W. proposes, it is stated, to construct a new line of railroad from Elmore to Wharncliffe, a distance of 53 miles. This construction would, if only Virginian westbound coal is considered, be an economic waste, because the existing lines of the C. & O. provide a short, direct and economical route for this coal. As will be shown in detail the existing main line and branch lines of the Virginian fit into the existing lines of the C. & O., for this movement precisely as if the C. & O. lines had been designed as an extension of the Virginian's lines.

"Eastbound coal from the New River district can be more economically transported via the Chesapeake & Ohio and Virginian unified system than via the Norfolk & Western and Virginian unified system because such coal can be routed over the most economical route, as for instance coal from Chesapeake & Ohio mines in the southern portion of the New River district can be more economically handled by the Virginian and such coal from Virginian mines in the Northern portion of the New River district can be more economically handled by the Chesapeake & Ohio.

"The Virginian Railway provides a short route from existing Chesapeake & Ohio coal mines located between Pemberton and Stone Coal Junction, including the Stone Coal branch, to the Carolinas and the Southeast in connection with the Southern Railway via Alta Vista and Seaboard Air Line via Alberta, the Atlantic Coast Line

via Jarratt and the Norfolk Southern via Suffolk, Chesapeake & Ohio coal traffic now moving from such mines by way of Lynchburg, Richmond and Norfolk to points south of the junctions named can be economically diverted by way of the Virginian Railway to these junctions, and competition increased on this traffic. The Norfolk & Western is already provided with such short routes to southeastern territory and hence does not need to acquire the Virginian to obtain them.

"The Chesapeake & Ohio and Virginian have certain joint facilities and joint operating arrangements in the New River field. These arrangements are the best that can be made where two roads are participating. If the C. & O. and Virginian are consolidated large operating savings and increased efficiencies will result, by greatly decreasing the switching now performed.

"It is the desire of the Pennsylvania and also of the N. & W. that these two systems be consolidated and it is natural that this should occur. When this becomes a fact, if the Virginian was unified with the N. & W., it would be a part of a system having obviously large divergent interests from those of the Virginian. The Pennsylvania's dominant interest is naturally in the business originating in bituminous coal fields of Pennsylvania and other states lying north of the Potomac and Ohio rivers and not with the coal fields of southern West Virginia and Kentucky. It is the largest loader of bituminous coal in the U. S. as the system is now constituted without the N. & W. The mine operators along the line of the Pennsylvania R.R. are active and vigorous competitors with the mine operators along the line of the C. & O. and the Virginian.

"On the other hand, the interest of the Nickel Plate in the mining territory north of the Potomac and Ohio rivers is comparatively negligible and its dominant interest will lie in the development of the coal fields of southern West Virginia and Kentucky, which include the Virginian Railway mining territory.

"At an informal conference with the consolidation committee of the Interstate Commerce Commission, held on January 26, 1925, there was presented a recommended plan of consolidation providing for the consolidation of the railroads east of the Mississippi into four systems. Recommendation that this plan be adopted was made by the N. Y. C., B. & O., and Nickel Plate Systems but the Pennsylvania system did not agree to the recommended plan. It is still strongly felt that the plan then recommended is a proper one and should be carried out. In this plan it was recommended by the three railroads that the Virginian be consolidated with the Nickel Plate system. Your attention is called to the reasons given as to why the Virginian should form a part of the Nickel Plate system. This contains largely the same reasons I have outlined but deals more particularly with the recommended four party plan as a whole, showing among other things the disproportionate financial investment of the Pennsylvania and Nickel Plate which would be augmented by the inclusion of the Virginian in the Pennsylvania system.

"The operation of the Virginian as a part of the Chesapeake & Ohio system will produce very large savings in operating expenses and in prospective capital expenditures for new equipment and facilities and will result in more intensive use of the Virginian Railway, its motive power, coal cars, shops and other facilities, all of which will be in the public interest. Uniting the Virginian with the Norfolk & Western would not only destroy competition which today exists between the Virginian and the Norfolk & Western but under their suggested plan of operation would mean substantial abandonment of part of the existing railway of the Norfolk & Western and the Virginian, which is not in the public interest."

Freight Car Loading

WASHINGTON, D. C.

REVENUE freight car loading in the week ended November 28, which included the Thanksgiving holiday, amounted to 923,213 cars, a decrease of 134,461 cars as compared with the preceding week but an increase of 44,082 cars as compared with the corresponding week of 1924 and of 88,132 cars as compared with 1923. Increases as compared with last year were shown in all districts and in coke, one, merchandise and miscellaneous freight, while decreases were shown in grain and grain products, livestock, coal and forest products. As compared with 1923 increases were shown in all classes of commodities except livestock. The summary, as compiled by the Car Service Division of the American Railway Association, follows:

REVENUE FREIGHT CAR LOADING

Week Ended November 28, 1925

Districts	1925	1924	1923
Eastern	203,154	200,485	202,787
Allegheny	184,102	174,270	169,175
Pocahontas	56,548	44,858	33,063
Southern	146,176	139,706	127,265
Northwestern	109,447	105,764	105,429
Central Western	151,536	142,366	134,693
Southwestern	72,250	71,682	62,669
Total Western	333,233	319,812	302,791
Commodities			
Grain and grain products	48,696	49,324	45,673
Live stock	29,581	32,757	31,652
Coal	172,279	172,615	156,613
Coke	14,990	10,633	11,094
Forest products	65,199	67,156	64,859
Ore	15,912	11,481	12,356
Mdse., l. c. l.	232,152	221,900	215,252
Miscellaneous	344,404	313,265	297,582
Total	923,213	879,131	835,081
November 21	1,057,764	1,010,919	990,299
November 14	1,050,758	1,016,843	992,050
November 7	1,063,322	995,279	1,036,221
October 31	1,091,273	1,073,374	1,035,849
Cumulative total 48 weeks	48,402,513	45,938,677	47,340,470

The freight car surplus for the period November 15 to 22 averaged 124,818 cars, including 37,007 coal cars and 57,766 box cars.

The Canadian roads for the same period had a surplus of 8,010 cars, including 5,000 box cars.

Car Loading in Canada

Revenue car loadings at stations in Canada during the week ended November 28 were only 2,172 cars under the previous week's record. With fair weather in the western division grain loading continued heavy, the higher price also being a factor. Merchandise was down 974 cars in the eastern division and down slightly in the western division, and with the exception of a drop of 257 cars in miscellaneous freight in the western division, other commodities showed only small changes. Compared with the same week last year every commodity except lumber showed increases, grain loading with a gain of 6,820 cars and miscellaneous freight with a gain of 2,079 cars, the total increase being 12,604 cars.

	Total for Canada			Cumulative Totals to Date	
Commodities	Nov. 28, 1925	Nov. 21, 1925	Nov. 29, 1924	1925	1924
Grain and grain products	22,072	23,582	15,252	439,257	450,512
Live stock	3,238	3,151	2,996	117,776	114,703
Coal	9,169	9,335	7,830	215,998	264,842
Coke	553	511	375	14,586	11,343
Lumber	3,389	3,358	3,650	170,059	172,647
Pulpwood	1,655	1,393	1,359	119,768	117,807
Pulp and paper	2,429	2,326	2,096	98,382	94,398
Other forest products	3,122	2,800	2,383	135,205	122,212
Ore	1,400	1,608	1,181	68,505	60,637
Merchandise, l. c. l.	15,228	16,283	14,608	733,617	701,346
Miscellaneous	14,198	14,278	12,119	623,510	588,485
Total cars loaded	76,453	78,625	63,849	2,736,663	2,698,932
Total cars received from Connections	33,995	35,168	31,370	1,594,450	1,510,467

The Economics of Transportation Service*

A discussion of the fundamental factors that enter into present day railroad operation

By L. K. Sillcox

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RAILWAY operation, as a business, involves not only the economic and physical side but policy as well. The latter is one of the most important aspects, if the business is to prosper financially. Policy must first be determined since it is the plan upon which basic principles depend. Without such a plan, co-ordination will exist only in a haphazard manner. The type of motive power, to be used for instance, must be such as to harmonize with the plan or policy and must be co-ordinated with all other activities. If the policy is dictated by service conditions perhaps some of the economic features may be sacrificed. On the other hand, if the economics of the problem are of first importance, a study of the subject must be built up around those considerations. Where the conservation of natural resources must be taken into account, this aspect must be super-imposed upon the others. If the demand for more and better service, at less cost, is to be met, and at the same time a fair return be earned on the capital invested, means must be found for producing that service at a satisfactory figure. Whether this may take the form of improved efficiency in respect to the existing plant, or whether it will be necessary to provide a more modern plant, is a question which has to be decided in each case strictly upon its own merits.

For a long period, particularly in the west, railway managements have been concerned with policies of extension, and not much opportunity has been given for thought concerning the need of making an intensive study of moving more business promptly at less cost with the fewest number of modern terminals, shops, etc., as well as the least complement of motive power and rolling stock necessary to handle the business. To judge what may be expected from the standpoint of economies in the functioning of transportation systems throughout the country, we must be governed largely by trends. But in doing so, it is necessary to take into consideration many of the differences in the characteristics of the larger individual carriers.

If the public is to judge the efficiency of any railway system by the net returns, then we are not prepared as yet, to establish a rate structure based entirely on this factor because development has not been uniform and the distribution of the population, tonnage or industries, is not yet such as to permit of considering the growth one of general volume. We have seen considerable development throughout the southwestern states, and more recently in the southeastern territory, but we cannot predict when a similar movement may take place in the remaining sparsely settled sections of the country. The mileage, for instance, in the district west of the Mississippi River is greatly out of proportion to the density of traffic as compared with other portions of the country except New England.

*Abstract of paper read at the Dec. 8, 1925, meeting of the New England Railroad Club, Boston, Mass.

In the matter of net returns we still have a considerable variance between the different administrations and the importance of this element, might be more clearly understood. Owing to the large range existing between various financial structures and the capital expenditures required by the territory traversed, it has not been found possible to make a reasonable net return.

In addition to the volume of traffic, the net return is also largely affected by the cost of maintaining the necessary capital, such as interest on investment, taxes, equipment rents, and other miscellaneous features which might be classed as non-operating expenses. Where it has been necessary to incur a capital investment out of proportion to the volume of traffic, the carrier may be as yet considered in the state of development and until such inequalities are overcome, judgment as to the operating efficiency, ability to earn a net return, etc., should take into account those factors which made possible the availability of capital during the early days of rapid increase in railway mileage.

The operating ratio is employed in some cases to indicate relative efficiency, but this does not take into account the obligations which must be met in maintaining the invested capital. The operating ratio does not express the net return, but the amount which is applicable thereto. In the regulation of any property, therefore, the result to be obtained in the operating ratio should be calculated on the basis of the relation of the non-operating obligations to the spread between operating revenues and expenses.

There has been a considerable improvement in operating efficiency during the last few years, but this has not made possible the ability to finance new or re-finance existing properties without considerable sacrifice. The expansion in railway mileage has been negligible in the past 10 years. Capital invested in roadway and equipment shows an increase of only 3.5 per cent per annum for this period. During approximately the same time, or since 1913, freight tonnage has increased but slightly. The average distance hauled was greater, showing an increase in ton-miles of 28.6 per cent. The average amount earned per ton-mile was 53 per cent greater, but the operating costs increased 102 per cent. It is, therefore, evident that the freight rate structure has not kept pace with the price levels affecting cost. Since freight earnings constitute approximately 70 per cent of the total operating revenue, they are of primary importance. Any rate structure which will permit a revenue consistent not only with ordinary operation and maintenance, but with the needed improvement of the property will solve the problem to a large extent and will also tend toward better service to the public. Highway transport introduces a problem concerning service that cannot be ignored. The railroads are likely to retain the main freight service, but light tonnage, short haul traffic and branch lines are greatly affected.

Capital is invested with the primary object of produc-

ing net earnings. Therefore, the time that railway equipment and property is not in actual revenue service represents a loss of potential capital earnings. This means dense or intensive traffic handling. Cars and locomotives must be as large and as few in number as the service will stand and be kept in service a large percentage of the time so as to make more ton-miles per day and per year. Yards and terminals must be as few in number as the service will allow and so laid out and maintained and of such capacity that cars and trains will be detained a minimum of time.

The Maintenance Problem

In order to accomplish a high degree of utilization, a high degree of maintenance is a necessity. This in turn demands serviceable as well as adequate repair facilities in shops, enginehouses and repair yards. Further, such facilities must be strategically located to reduce the amount of unnecessary waste time in accomplishing the required repairs. Maintenance materials and fabricated parts should be available in reasonable amounts. In addition, to an adequate degree of maintenance, a sound policy of retirements must be adhered to, so that equipment owned will be reasonably modern and capable of meeting the existing requirements without needing constant attention. There is a rather well defined line of demarcation wherein it is more economical to retire equipment and replace with modern units, rather than to repair and modernize with betterments. This dividing line, of course, varies with market and labor conditions and is affected by financial considerations. Obsolescence is not a constant, but is affected by the introduction of inventions and demands of passengers and shippers. There has been an improvement also in maintenance expense of equipment, further indicating the trend in ultimate economies. The maintenance of freight equipment, including locomotives and cars cost $1.192 per thousand gross ton-miles in 1920 as against $907 in 1924. Passenger locomotive and car maintenance per train-mile cost 57.6 cents in 1920 and 41.7 cents in 1924.

It is evident that to promote a maximum utilization of equipment, it is necessary to have locomotives and cars capable of meeting existing demands economically. Larger cars, hence fewer units, is an element. Repair facilities must be adequate and include tools that permit of the most modern repair practices. The personnel, both operating and repair, must be of the highest order and the relations between employer and employee must be on a plane of mutual understanding and respect. Materials must be provided of the proper grade and in adequate quantity. The best possible quality of water must be provided at advantageous locations. The fuel provided must be of uniform quality and proper preparation, and the facilities for handling must be adequate and at the most advantageous location. Yards and terminals are required that will permit expeditious make-up and movement of trains. However, any economies practiced in methods or devices are not a clear gain in all cases, because of the offset in carrying expense.

A review of the statistics applying to Class 1 railways for the year 1924 as indicated by the I. C. C. report, reveals that the total railway revenues were expended as follows:

Maintenance of way and structures, per cent	13.42
Maintenance of way equipment, per cent	21.05
Operating costs (including fuel, 10 per cent)	37.33
Miscellaneous expenses of operation, per cent	7.84
Financial costs, per cent	14.82
Balance available for dividends and reserve, per cent	5.53
	100.00

Approximately 13.42 per cent of the total revenues was expended in maintenance of way and structures, including a small amount for depreciation on property, although it is not customary to charge depreciation on fixed property. The savings possible from improvements in this respect will doubtless come from heavier section of rail, treated ties and greater depth of ballast. Such improvements, however, will involve an added charge to capital with an increase in interest burden.

The Human Problem

It avails an administration but little to have perfected itself with facilities, if for any reason it fails in organizing trained minds that are competent to control and operate such facilities. The spirit in which the work is undertaken has much to do with the success attained, irrespective of any particular method followed. We live in an age of organization and men in every walk of life are eager to lend their best efforts to that force which they believe will function in their behalf. To the experienced observer, it must be apparent that the benefits obtained around the conference table with employees, are of basic importance and the quality of contact almost invariably decides the results. Patience, tolerance and sympathetic helpfulness will often lead many to become the staunchest supporters and defenders of the industry as soon as they have grown to consider that constructive co-operation is necessary. In developing the highest standard of team work, we should always try to see that no final decision with regard to any operation that may concern the employee is attempted, until consultation has been had with the responsible man and his conditions thoroughly analyzed and understood.

The Material Problem

A proper turn-over of the investment in materials and supplies for maintenance and operating purposes is a prime requisite. Beyond this, a fundamental policy with objectives looking to the future should be considered, pointing to features of ultimate saving. If facilities are to be kept to a minimum, they must be of a modern kind capable of economical and continuous service, with the further requisite that the unit of work done will be favorable with respect to cost and time. This also furnishes one of the most constructive ways of keeping material moving. Material held at many points results in divided responsibility and provides opportunity for disregard and deterioration. This policy also increases the cost of design and construction to say nothing of workmanship, which results in the tying up of complete units of motive power and rolling stock for minor difficulties when needed for service.

Such features should be considered most carefully when budgets are prepared, with a view of replacement or detailed improvement. They may indicate that the first money expended should be allocated in bringing the design of motive power and rolling stock up to a proper standard of reliability and unit cost for up-keep. Many such programs could be easily developed showing actual returns of not less than 25 per cent per annum on the first cost, thus improving the service, lessening the burden on shop facilities and keeping stocks of replacement material to a minimum. The features mainly referred to are trucks of all classes, underframe constructions, piping, fittings for locomotives and cars, alloy-steel for sheets on cars and other purposes, substitution of wooden sash in passenger cars by non-rusting metal type, etc.

The Steam Locomotive

Great strides have been made in locomotive design and it is difficult to predict what the future will lead to. The goal to be achieved is a locomotive that will show the maximum spread between the combined operating and

maintenance costs, and the earning capacity under average working conditions. This bespeaks a high efficiency in order that a pound of coal will evaporate a maximum quantity of water and that the steam thus generated will produce the maximum sustained horsepower. Progress is being made, for during the past year or so, locomotives have been placed in service with a thermal efficiency 60 per cent in excess of the older and more conventional types. Locomotives of high efficiency, found to be in every way reliable performers when adequately maintained, are, however, of no avail unless used in an effective manner. More tonnage per train and a greater productive utilization of time are essential elements. Since the first of 1922, the number of steam locomotives owned has decreased by .2 per cent, but the average tractive force has increased by 9 per cent. This enlargement in the size of locomotives has brought expansion in the number of devices conducive to better utilization.

The cost of handling locomotives in enginehouses is approximately $130,000,000 per annum for Class I roads, representing 2.64 per cent of the total operating expense, exclusive of taxes and non-operating expenses. We may expect that a reduction in the number of locomotives used for a given service, will correspondingly lessen the amount of turning work and the standby losses so far as fuel and water are concerned. Improvements in design and operating practices are reflected in the fuel performance of locomotives. Freight locomotives in 1920 required 197 lb. of coal per thousand gross ton-miles as against 170 lb. in 1924, a decrease of 13.7 per cent. In passenger train service, the decrease was 10 per cent. Fuel cost was approximately 10 per cent of the total operating expenses in 1924 or $448,646,810, as compared with $689,632,039 in 1920. The problem is one of determining whether the cost of maintaining capital to finance improvements that reduce operating costs, will be more or less than the amount of such reduction. The circumstances surrounding each individual case require very close analysis before this can be stated.

The locomotives are of first consideration in improving operation. Improvements are continuing not only to increase the tonnage per train, but the length of runs with the idea of attaining a greater service per locomotive and a greater thermal efficiency.

Proper tonnage rating of locomotives is worthy of the best attention which may be given it. The most important thing to know is whether locomotives are loaded just right or whether they have too much or too little. Many factors are involved and each section of the railroad is a problem in itself. Territorial distribution of power calls for continuous and close study. A thorough knowledge of road operating characteristics and the possibilities of each type of locomotive in service is needed in order to insure the best movement on the road. Tonnage rating and locomotive assignment form a combined subject which should be reviewed by the executive in a comprehensive manner, at least once each year, studying actual performances and measuring the best showing in any territory of the line with a view toward making the experience gained applicable to a greater percentage of the mileage as a whole.

The Electric Locomotive

On the other hand, new types of power are being developed and we are now having some experience with the electrification of steam railway properties. There has also been some development along the lines of oil-electric locomotives and while little is known of their possibilities, nevertheless, they give rise to the hope of producing cheaper power with all, or practically all, of the advantages claimed for electric operation. In the case of electricity, the investment charge per mile or per section, is heavier than for steam, under certain circumstances. For instance, where the volume of traffic exceeds the track capacity, it becomes necessary to double track under steam operation, or to electrify. In such cases the investment involved may be favorable to electricity. The investment in tractive force of electric locomotives equivalent to steam is heavier. Likewise, the investment in power and distribution lines with sub-stations is heavier than for coal and water facilities. From an operating standpoint it has been found, in some instances, that electricity is cheaper than steam. This is effected by the length of electrified territory and the volume of traffic offered. Fewer electric locomotives are needed than steam units for a given service and this effects the cost of maintaining and turning power. In practically all cases, electric locomotives have been designed to haul a greater tonnage than has been obtained under steam operation. To this extent, of course, transportation has been reduced for the tonnage so hauled; however, this might be obtained if new steam power were considered. Electric power has greater dependability and this, together with the fewer trains required for a given volume greatly simplifies dispatching and shows a lower cost.

In the matter of fuel, there is a saving in favor of electricity, where demand characteristics are proper. The extent of this depends upon the method of generating power and the distance it must be transmitted as compared with the distance coal has to be transported and the extent to which it must be stored. Whether there will be an investment involved depends upon whether power is generated in commercial or railway plants. If in the latter, it may be hydro-electric or steam plants, the latter of which involves a consideration of coal transportation. Coal transported over the consuming line bears no freight charge for that service.

The maintenance cost of steam power is customarily stated as the cost per mile run. This method does not lend itself to a comparison between steam and electric power, because the size of unit is involved and there are no electrified sections long enough to permit of extending the mileage performance to what might be considered the limit. For these reasons, it is not possible to make a definite statement of the comparative costs, but it may be said that mile for mile, without considering trailing load, the maintenance of electric power should be less than steam. Definite data is not available for determining the extent of the possible economy, because electrification has not, thus far been sufficiently general. A large portion of existing electric operation is in suburban service, installed largely by force of circumstances. Terminal operation is difficult of analysis and the coal saving over steam operation in such service is not definitely known. The general assumption has been that a more definite saving would come from road and main line freight and passenger service.

Wherever electrification has been provided, it has proved satisfactory, as a whole, from a purely operating standpoint. It is assumed that maintenance of way costs would be increased because of added facilities to maintain and that possibly locomotive maintenance could be decreased slightly. It might be assumed that electrification would be of direct benefit to transportation, the larger element of saving being in fuel and train crew expense. It has been the custom to consider the advantage of electrification, but this installation would mean a replacement of a large investment in the present steam locomotive and this investment would have to be retired and the remaining retirement charge would go to operating expenses. It is for this reason that great caution has existed in any serious consideration of electrification of steam railroads,

with the further fact in mind that where electrification is provided, the plant as a whole must be designed and installed to meet the maximum requirements of the service and this demand oftentimes is only seasonal or effective through short periods of the day.

At the present time, there is further hesitation in extending electric zones because of the apparent possibilities of the oil-electric locomotive, which appears to be adaptable to the present form of steam operation in practically all cases, except for considerations of fuel and water supply. If it should so happen that this form of power develops proper reliability and consistency of performance at a reasonable maintenance and operating cost and has an investment charge below that of completed electrified sections, it will doubtless find its way gradually into general use without any radical changes in the methods of train operation, financial structure, etc. In this case the changed fuel supply must be seriously viewed and ranges of cost anticipated with accuracy.

The Passenger Car

In the case of passenger train cars, particularly where competition is keen, the average age of the cars most needed for service has a large bearing on the cost of maintenance. In trans-continental traffic, where railroads own their own sleeping cars, it has been found that the number of units for this particular service averages about 15 per cent of the total and yet is responsible for 25 per cent of the total maintenance cost chargeable to passenger car repairs. Thus, if we had an average expense of $2,000 per car, and 2,000 cars considered as owned, it would result in sleeping cars requiring $3,333 per unit per year, and all other cars, including dining cars, parlor cars, observation cars, coaches, etc., $1,765 per car per year. If an average life of 33½ years were to be maintained as a basis for turn-over and to offset obsolescence, then it would be necessary to purchase approximately 60 new cars per year and retire a similar number of old cars. In this way, much could be done to improve the situation of passenger equipment throughout the country. But present cost seems prohibitive and there is naturally a hesitancy to do this in view of a gradual decline in passenger revenues brought about largely by motor bus and private automobile competition. It should be remembered that the maintenance of passenger train cars does not run parallel with use, and back shopping is determined more on the basis of condition of paint and upholstery than wear, for the reason that most other features of repairs can be taken care of at major terminals. The scheduling of passenger train cars through back shops can be placed on a basis practically the same as for steam locomotives, so as to maintain the proper sequence in shop operations and attain complete utilization of men, materials and facilities.

The Freight Car

Of the 21.05 per cent of total revenues consumed by maintenance of equipment, 18.25 per cent applies to actual repair work. The remaining 2.8 per cent is in reality a matter of amortization since equipment charges involve the original cost of rolling stock which must be allocated currently to the maintenance account. The improvement of equipment, especially locomotives, has not resulted in a direct reduction in maintenance cost, but rather reduction in operating expenses. A considerable ultimate saving in maintenance has resulted from improvements in cars. All improvements to equipment add to the interest bearing debt. An improvement in locomotives and cars should be reflected to some extent in reduced transportation costs.

It is generally assumed that freight train cars should be given classified repairs of a heavy nature each eight to 10 years, depending upon the character of service and construction of the cars involved. Starting with 1910, when an increase in size and power of locomotives was undertaken and had proceeded to this time, we have found that this affected the strength of freight cars, and the risk in operating cars of wooden underframe construction is daily increasing, to say nothing of the maintenance burden.

Most administrations have their freight car repair and improvement work well regulated, with the object of concentrating the operations at as few large points as possible. It seems wise to do this in order to centralize control of labor and material as well as output. The charges for maintaining freight cars, of course, includes all classes of work, even to the point of interchange inspection and lightest running attention in transportation yards. This leads to the need for thoroughly systematizing the inspection of both passenger and freight trains at originating stations and intermediate terminals so that any defects developing on the road may be traced back for responsibility as far as the individual inspector is concerned. Much can also be done to have train crews handle defects developing on the road, so as to bring cars into terminals, and thus facilitate train movement.

Centralization

Stress can well be placed on the performance as to engine and car failures, with an analysis of the cause in each case, in order to arrive at the proper correction and prevention. A well founded policy embraces such features as overcoming obsolescence by proper rates of retirements of old equipment and improvement of existing units and the acquisition of new construction.

Due to the routine operation involved, much good can result from suitable educational methods employed with supervisors and workmen, dealing with such subjects as safety first, methods of doing work, air brake functioning, interchange inspection, train yard inspection and safety appliance requirements.

The Coal Pile

Coal can be conserved by proper design and intelligent operation of motive power; the providing of adequate facilities for the cars and housing of locomotives; the continuous use of locomotives while under steam; the proper selection, distribution and accounting for coal supplied; and adherence to the principles of fuel conservation as an objective on the part of one and all.

Conclusion

Future development of power and rolling stock will be commensurate with the viewpoint held respecting the economic movement of tonnage throughout the country. More favorable results may be expected through the adoption of the best methods of train assembling, dispatching and movement. The general situation, however, is quite serious from a financial standpoint, but if conditions will permit creation of a reasonable reserve for meeting financial obligations, it may then be expected that some of the improvement work here suggested will be possible of attainment and the estimated results realized.

Finally, it should be remembered that no increase of expenditure over the unavoidable minimum is justified or proper unless the increase in earnings or savings in expense resulting with reasonable certainty, may be counted on to make it a profitable investment. In like manner, no saving of expenditure is justified, however serious the future seems, when it can with certainty be shown that the additional expenditure will, fixed charges included, be in itself a paying investment.

A Portion of the General Office of the Store Department with the Telephone Switchboard in the Foreground

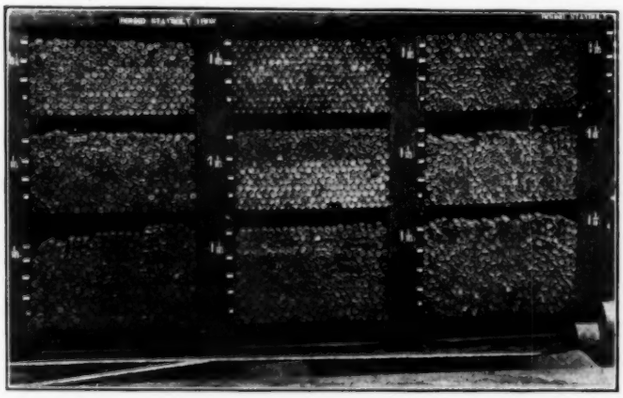
Budgets and Daily Reports Aid in Controlling Supplies*

Improved purchasing and stores practices vital factors in reducing stocks on Illinois Central

THE difficulty in commenting upon the stock control that enabled the Illinois Central to experience a $30,000,000 decline in its purchases of material and supplies and a $10,000,000 reduction in its volume of unapplied material in the course of a single year without noticeable confusion or injurious after-effects is the impossibility of discerning where the influence of one department left off and the other began. Insofar as these recent developments and also the present conditions concerning material and supplies on the road are the result of express endeavor, they reflect the interest of all departments.

The Elliptical Spring Storage at the General Store, Where All Repaired Springs Carry a Yellow Mark to Facilitate Placing Proper Charges

The satisfaction noted within the mechanical department over the reduction in the reserves of material held for its use from approximately $7,000,000 to $4,600,000, is of significance in this connection, as is also the reduction of about $6,600,000 that took place in the fuel bill. These are examples of a departmental understanding of the economic aspects of material that are essential to judicious stock control. It is chiefly in the purchasing and stores department, however, that the machinery of the control immediately in question is found.



At Burnside the Staybolt Iron Is Stored Below a Platform Where Graduated Scales on the Sides of All Pockets Solve the Problem of Taking Inventory

Master Stockbook Used

On the Illinois Central the purchasing and stores departments are combined, with the general storekeeper reporting to a vice-president in charge of purchases and supplies. This has been the practice since 1912. From

* This is a continuation of an article published in the issue of December 15, describing a $30,000,000 reduction in purchases of material and supplies and a $10,000,000 cut in the volume of unapplied material which has recently been made on the Illinois Central.

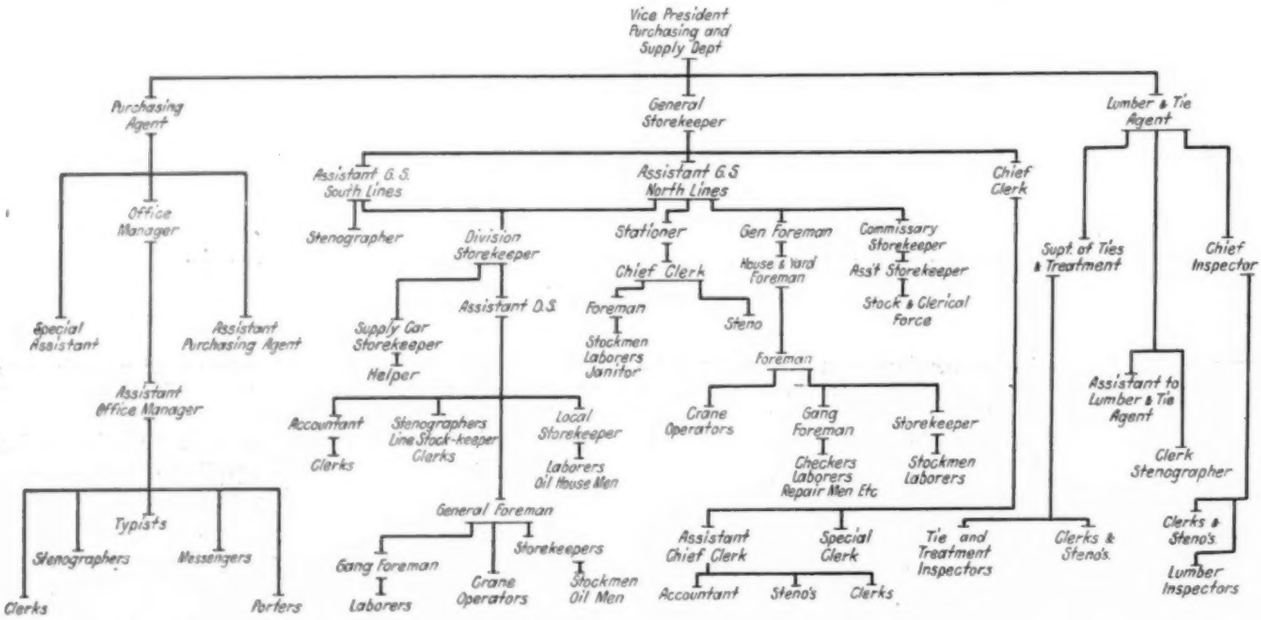
June, 1908, when the supply department was organized it was an adjunct to other departments, the general storekeeper reporting to the general manager until 1909 and from this time until 1912 to the purchasing agent. The plan of organization at present is shown in the accompanying chart. The stores department has custody of all material with the exception of fuel and ice, the stationery department having been placed under the jurisdiction of the general storekeeper in 1919. The jurisdiction of the head of the purchasing and supply department, on the other hand, extends to the care of all material until applied, as well as to its purchase.

The methods employed in the control of the purchase and handling of this material are various. Much credit is given the system of standard stockbooks for any success in recent efforts. Similar to other roads, this practice is essentially one of maintaining a master stockbook at headquarters and assigning a specified day during each month when inventories shall be taken of the same class of material at all stores and the report of stock forwarded to the general store for posting in the master book preparatory to the forwarding of requisitions for the same class of material.

There are two respects in which the Illinois Central procedure with these stockbooks differs from the usual practice. One results from the arrangement of local stores. On the Illinois Central the division stores are in the nature of district stores, inasmuch as it is the responsibility of these stores to supply the requirements of one or more local stores on the division which, of thmeselves, carry too limited a stock for the requirements of a standard stockbook. To avoid the distortion of division store inventories that would result where the stock of substores was consolidated on the books with the divisional store stock, and at the same time to secure a record of conditions at the local stores for meeting emergencies as well as for general inspection purposes, a place is provided in the record of each item of the standard stock at division stores for the separate report of quantities held at local stores.

The principal difference in Illinois Central storehouse procedure lies in the method of handling requisitions. The general store of the Illinois Central is a general store in the true sense of the term. It is the distributing point for about 75 per cent of all of the material used on the railroad. The only staple materials that are not actually supplied from this store are lumber for buildings, bridges, etc., new rail, carloads of oil, sand, etc., and wheels and axles, and similar supplies, which are sufficiently heavy or large in volume as to warrant their shipment direct from the manufacturer to the respective stores which issued the order for it.

There are 15 different sections in the general store, each in charge of a general storekeeper. When requisitions for staple commodities are received from divisional stores they are first checked against against the master stockbook in the customary manner for the principal purpose of justifying the quantities ordered and also for the purpose of determining whether the order of one store can be filled by drawing on surpluses at some other store. Thereafter, however, all unfilled requisitions for staple articles are issued upon the proper stockkeeper in the general store who either fills them from the stock on hand or holds them until the necessary stock is obtained. The result is that all purchase requisitions for staple articles originate only at the general store.



The Plan of Organization of the Purchasing and Stores Departments

The standard stockbook system was introduced on the Illinois Central in 1922, after studies had been made of practices on all class A railroads. Its effectiveness has been increased by gradual standardization in the equipment of stores and in the arrangement of stock at all points, also by the tray system of piling which was introduced shortly before the stockbooks.

Telephones Dispense with Telegrams

The efficiency of the purchasing and stores department has been further increased by an unusually complete system of telephone communication. In the store department's general office is a switchboard, with telephones not only in the private offices, but throughout the outer offices of both the store and purchasing departments and conveniently at hand in every stockroom as well. The system includes both general service and private wires for both local and long distance calls. With it com-

munications may be had with any stockkeeper in the stockroom on a moment's notice. The same is true of inter-departmental service with the purchasing offices (located several miles distant) or with parties on the public exchange, while the departmental long-distance wires afford ready communication with store points on the line. By using automatic devices and with the phones generously distributed among officers and clerks, there is every encouragement for the promotion of dispatch in all avenues of inquiry. There is practically no telegraphing associated with the functioning of the Illinois Central stores department.

While the more orderly system of piling and the use

DAILY REPORT SHOWING ESTIMATED VALUES OF PURCHASE ORDERS ISSUED; INVOICES RECEIVED, VOUCHERED AND ON HAND UNVOUCHERED

OFFICE OF PURCHASING AGENT

MATERIAL	INVOICES				VOUCHERS		
	Unvouchered Brought Forward	Received Today	Received to Date This Month	Total to be Accounted for	Issued Today	Issued to Date This Month	Invoices Unvouchered Today
Madison Coal Corp.	$	$	$ 4,040	$ 4,040	$	$ 4,040	$
Other Coal		79 430	287 861	287 861	79 430	287 861	
Ice		34 087	81 064	81 064	34 087	81 064	
Rail	340 349	30 428	191 988	340 324		539 904	300 198
Ballast		13 430	15 427	15 427	13 430	15 427	
Lumber	84 080	23 999	132 080	307 080	600	151 609	87 483
Creosote Oil							
Wabash Ties							
Ties and Treatment	44 847	10 368	19 838	64 440		4 980	61 960
Other Material	2 024 884	61 830	891 196	2 906 080	43 348	934 724	1 972 356
Total	2 847 412	235 964	1 594 488	3 962 840	387 836	1 448 614	2 192 484
Previous Month	2 000 714	304 870	2 248 944	4 249 660	366 423	1 520 340	2 868 790
Previous Year						1 281 746	
Vouchers Issued Today Include	Regular $ 387 836				Discounts $	Total $	387 836

VALUE OF ORDERS ISSUED

	Madison Coal Corporation	Other Coal	Ice	Rail	Ballast	Cross Ties and Treatment	Work Authorities	Other Materials	Total
Orders Issued Today	$	$ 79 430	$ 34 087	$ 30 428	$ 13 430	$ 10 368	$ 46 836	$ 47 734	$ 239 896
This Month to Date	4 040	287 861	81 064	191 988	15 427	19 838	272 837	777 287	1 647 534
Same Period Last Month	441 404	340 411	32 080	249 441	617	27 450	188 427	944 441	1 783 629
" " " Year	388 884	279 600	60 371	476 383	90 180	30 863	207 744	1 017 035	2 519 304

*Includes only cost Contract

The Daily Report of the Illinois Central Purchases

of telephones and of the system of standard stockbooks comprise only three of many factors in the control of stock, it is significant that with the improvement in stockkeeping there have been no more material shortages with the reduced reserves than there were with twice the amount of stock on hand. It is also significant that, through the use of stockbooks, the Illinois Central's staple stock has been reduced from 42,000 items to 35,000 items by the disclosure of obsolete stock and by efforts towards simplification, a work which is being carried on continuously with one class of items at a time. A special report secured periodically from division officers in which all slow-moving stock is listed, supplements the stockbook record and other methods in detecting obsolete material, as well as avoiding surpluses.

Stock on Books Till Applied

The Illinois Central adheres to the practice of considering no material as issued until it is actually applied. While this is relatively simple to do with the material held at storehouses, particularly with the added surveillance of stock that accompanies the operation of a shop delivery system, other methods must be followed with reference to line stock, such as rails, ties, bridge timber and similar materials which are often shipped direct to the point of use without handling at store points. For the better control of this stock each division has its line stockkeeper, who devotes his entire attention to the custody of such material and to the upkeep of a line stockbook which contains, among other things, a complete record of all inventories and transfers. The division line stockkeeper, while an employee of the stores department, is the contact man between the custodians of material and the roadway department. His functioning is indispensable to low surpluses and correct accounting.

As an additional factor in the control of material, it is the practice on the Illinois Central to require that all requisitions for the purchasing of material falling within the custody of the stores department, including even rail and ties, receive the approval of the general storekeeper before reaching the purchasing department. It is only in cases of emergency that orders are issued direct and even in these cases the store department's tentative approval is secured by telephone. The jurisdiction of the general storekeeper in this respect extends even to the special requisitions of department heads, on the theory that there may be facts known only to the stores department from its intimate contact with the material situation which would advise revision, cancellation or postponement of the original order.

A Budget to Govern Purchases

In connection with this review of requisitions by the store department the Illinois Central has introduced a new form of budget. Budgets, as they are commonly considered, are now familiar to railway operation. Such budgets are particularly well known on the Illinois Central, where it has been the practice for many years to control the expenditures of all departments. As an example of the extent to which this road has developed this type of budgeting a statement is prepared in the maintenance of way department well in advance of each year outlining the work to be done in the following year to the point of actually prescribing the month in which each project is to be undertaken and the allowable expenditure for

The Large Volume and Quick Turnover of Bolts at Burnside Led to the Adoption of an Open Type of Storage When Revamping the Storehouse Interior

the month. These budgets for the regulation of the using department have been of decided benefit from a material standpoint insofar as they require using departments to outline their material requirements well in advance and afford the purchasing and stores department an opportunity to anticipate the future more accurately than could be done otherwise.

Unlike these budgets, however, the stores budget is designed for the guidance of the stores department. In principle it places a limit on the value of requisitions which the store department can issue each month. It is not a complicated document. It is simply a page on the general storekeeper's desk which originates from a monthly conference with the purchasing officer, when,

with the aid of information developed at the last monthly expense meeting when the various department heads of the railroad are informed of their allowable expenses for the ensuing month and with the aid of other data, an allotment is established within which to keep the value of requisitions. This allotment is divided about equally among the days of the month and a record made of the specified allotment per day and of the cumulative allotment up-to-date, for use in comparing the value of all requisitions which have been issued during each day of the month and for the period of the month up to the day in question. The latter values are prepared daily in the store department general office simply by totaling the price extensions which have been made on all requisitions. While by no means operating as an accurate control on the number of requisitions issued, this budget has proved a decided help in regulating the transactions of the department.

The principal device upon which reliance is based for the control of purchases is a daily report prepared in the purchasing department. Briefly, this report gives the value of (1) actual purchase orders issued, (2) the invoices received, (3) the invoices vouchered, and, (4) the invoices on hand but not vouchered with reference chiefly to coal, ice, rail, ballast, lumber, ties and "other material." In addition to recording the amount of the orders placed in these departments of work for the day in question it also shows the value of each class of orders placed during the month, the value for the same period of the preceding month and for the same period in the same month of the preceding year. It carries forward the total unvouchered invoices and in addition it affords the desired totals for the periods considered. This report is made up from values estimated by the purchasing department from its records of freight charges and prices and is reproduced in a sufficient number of copies to furnish the several department heads with a record of values not later than the morning of the day after the invoices and orders are received. The value placed upon this report at the present time, as well as during the decline of purchases and reserves, is shown by the constant reference made to it and the particularly close scrutiny to which it is subjected.

Other reports which have a definite place in the operation of the purchasing and stores department in connection with stock control include a statement showing the amount of material received, the percentage disbursed, the number of days' supply of material on hand and the cost per thousand dollars for handling material by the various stores and for the store department as a whole. This record shows the values for the month in question for each store as compared with the values for the same month of the preceding year and affords each storekeeper a means of comparing his work with the performance of other stores, as well as for the use of the general store in its regulation of stock.

Another report is the composite statement of all supplies used on the system, which arranges the supplies according to the standard classification of material and shows the amount of material in each class on hand at the beginning and at the end of each month, together with the purchases, the transfers, the issues and the sales. Such a statement is also prepared on each division for the materials handled on that division and summaries are prepared at the end of the year in an annual statement showing the comparison of the transactions during the year with those of the previous year. These statements, comprehensively picturing as they do in understandable form the financial aspects of material transactions, are considered highly valuable to the control of stock, notwithstanding the delay in issuance which their preparation entails.

President Urges Consolidations Under Supervision of I. C. C.

WASHINGTON, D. C.

A SIMPLE statement that the condition of the railroads "would be improved and the public better served by a system of consolidations," and a recommendation "that the Congress authorize such consolidations under the supervision of the Interstate Commerce Commission, with power to approve or disapprove when proposed parts are excluded or new parts added," constituted what President Coolidge had to say on that subject in his message to Congress on December 8. Not a word about "compulsory" consolidation, although most of the newspaper writers who have attempted to interpret the President's views during the past year have invariably predicted that he would propose such a course, and nothing about the details of the proposed legislation, although the fact that the brief language used covers so closely in a general way the more specific recommendations made by the Interstate Commerce Commission on the same subject in its report would lead to the inference that they are what he had in mind. The President even omits some of the arguments in favor of consolidation which he used in his messages of 1924 and 1923, such as those relating to reductions in freight rates, and he has also omitted the suggestion contained in his last year's message that some form of government pressure be applied in case the railroads do not voluntarily consolidate enough. In last year's message the President expressed the belief that a predetermined plan such as is contemplated by the present law is unnecessary and the commission has now recommended that the law be amended to omit the requirement that it adopt and publish a complete plan.

President Coolidge began the short section of his message in which he discussed the railroads by saying: "The railroads throughout the country are in a fair state of prosperity. Their service is good and their supply of cars is abundant." Then, after the two sentences on consolidation, he said:

"I am informed that the railroad managers and their employees have reached a substantial agreement as to what legislation is necessary to regulate and improve their relationship. Whenever they bring forward such proposals, which seem sufficient also to protect the interests of the public, they should be enacted into law.

"It is gratifying to report that both the railroad managers and railroad employees are providing boards for the mutual adjustment of differences in harmony with the principles of conference, conciliation, and arbitration. The solution of their problems ought to be an example to all other industries. Those who ask the protection of civilization should be ready to use the methods of civilization.

"A strike in modern industry has many of the aspects of war in the modern world. It injures labor and it injures capital. If the industry involved is a basic one, it reduces the necessary economic surplus and, increasing the cost of living, it injures the economic welfare and general comfort of the whole people. It also involves a deeper cost. It tends to embitter and divide the community into warring classes and thus weakens the unity and power of our national life.

"Labor can make no permanent gains at the cost of the general welfare. All the victories won by organized labor in the past generations have been won through the support of public opinion. The manifest inclination of the managers and employees of the railroads to adopt a policy of action in harmony with these principles marks a new epoch in our industrial life."

Senator Cummins is still working on details of his new consolidation bill, with the idea of introducing it as soon as possible, and Senator Watson, chairman of the committee on interstate commerce, has indicated that the subject will be the principal one to be considered by his committee this session.

Although the usual large number of new and old bills was introduced in the House and the Senate during the first two or three days of the session which opened on Monday, there were very few railroad bills among them. Senator Gooding introduced a new fourth section bill, as a substitute for the one which failed at the last session, to prohibit fourth section relief to meet water competition, actual or potential Senator Cummins also reintroduced two bills left over from last session to punish false billing and commercial bribery.

Several other bills left over from last session were introduced in the Senate, including one by Senator Howell to limit the powers of the Interstate Commerce Commission in rate-making to the establishment of maximum rates only; one by Senator Fess to amend the bill of lading act; one by Senator Lenroot to give military status to members of the Russian Railway Service Corps; two bills by Senator Mayfield to amend paragraph 18 of section 1, and to repeal paragraphs 3 and 4 of section 13 and section 15a of the interstate commerce act; two bills by Senator Pittman to amend paragraphs 3 and 4 of section 13 and paragraph 18 of section 1.

In the House two bills were introduced by Representative Hawes of Missouri to provide for the creation of regional commissions to assist the Interstate Commerce Commission and one by Representative Denison of Illinois for the protection of persons employed on express and baggage cars.

Representative Hoch of Kansas introduced a bill identical with Senator Gooding's fourth section bill. Representative Moore of Virginia re-introduced an old bill to amend the Carmack amendment. Representative Upshaw introduced a bill to require automobiles and other vehicles to stop at railway crossings. Representative Vinson of Georgia introduced a bill "to decrease rates, fares and charges of railroads." Representative Blanton reintroduced an anti-strike bill.

While the President referred to a "substantial agreement" between the railroad managers and their employees, it is understood that there is no actual agreement yet, although committees representing the railway executives and the employees' organizations have been conferring across the table in an effort to see if an agreement is not possible and representatives of the employees seem to be optimistic that such an agreement can be reached.

Report of Bureau of Finance, I. C. C.

WASHINGTON, D. C.

FOLLOWING is an abstract of the report of the Bureau of Finance of the Interstate Commerce Commission, which was included in the commission's annual report to Congress for the year ended October 31, 1925:

The table at the top of the next column is a statement of applications filed during the year for certificates of public convenience and necessity under the provisions of paragraphs (18) to (22) of section 1 of the act and of the disposition made.

A number of the applications disposed of during the year were pending on October 31, 1924.

Item	Number	Miles of road
Applications filed:		
For authority to construct new lines or to extend existing lines	73	3,512.50
For authority to abandon mileage	57	883.21
For authority to operate or to acquire and operate	37	2,935.40
Total	167	7,331.11
Certificates issued:		
Authorizing new construction	46	908.840
Authorizing abandonment	46	651.977
Authorizing operation or acquisition and operation	30	1,071.480
Total	122	2,632.297
Applications denied:		
For authority for new construction	3	234.03
For authority to abandon	1	14.66
For authority to operate	2	51.80
Total	6	300.49
Applications withdrawn:		
For authority for new construction	6	363.74
For authority to abandon	2	82.12
For authority to acquire and operate	3	77.96
Total	11	523.82
Applications dismissed:		
For authority for new construction	2	40.20
For authority to abandon	1	66.00
For authority to operate	1	161.65
Total	4	267.85

We have continued the practice of enlisting the cooperation of the state commissions in these cases. In 54 of them hearings have been held for us by state commissions during the year, and in most of such cases in which a decision has been reached we have followed their recommendations.

Recapture

Paragraph (2) of section 5 of the act authorizes us to approve by order the acquisition by one carrier of control of one or more carriers either by lease, or by purchase of stock, or in any other manner not involving the consolidation of such carriers into a single system. Under this paragraph 39 applications have been filed, 26 authorizations have been issued and 3 applications have been withdrawn.

In response to orders carriers have filed reports showing the following results with respect to excess net railway operating income subject to the recapture clause of the section:

Period	Number of reports	Number of reports in which excess income is reported	Amount of excess income reported
Applicable period, 1920	985	34	$2,155,092
Calendar year, 1921	967	27	443,831
Calendar year, 1922	920	49	1,805,125
Calendar year, 1923	874	47	6,830,375
Calendar year, 1924	798	22	1,182,222
Total excess	....	....	$12,416,645

In many instances carriers have amended their reports as originally filed by modifying the claimed property values and the net railway operating income, with corresponding modification of the excess income reported. Many of these reports include groups of carriers claimed by respondents to have been under common control and management and operated as single systems within the provisions of paragraph (6) of section 15a.

It should be borne in mind that the excess income reported has not been computed upon values fixed by us. For that reason the number of carriers finally determined to have earned excess income, as well as the amount of such excess income, may differ from the results shown by the carriers' reports.

During the year 33 carriers paid to us the total sum of $732,448 on account of one-half of their excess income as preliminarily computed for the various recapture periods. This sum added to the $4,955,197 paid prior to November 1, 1924, makes the total of such payments $5,687,645. As the bulk of these payments has been

made under formal protests and reservations, the general railroad contingent fund, composed principally of such payments, has not been available for the purposes contemplated by the statute.

In our last report we stated that formal hearings in recapture cases had been instituted. Eighteen of such hearings have been concluded, 17 are in progress, and 7 are set for future dates. Disposition of these 42 cases, and the assignment of others on the formal docket, will proceed as rapidly as possible.

Issuance of Securities and Assumption of Obligations

We have received 267 applications and 14 supplements thereto, and 2 petitions for rehearing, under section 20a of the act, and have authorized the issue of securities and the assumption of obligations and liabilities in respect of securities of others in the following aggregate amounts and for the following purposes:

Preferred stock	$17,225,330
Common stock	27,992,169
Total stock	$45,217,499
Bonds, collateral-trust	$23,000,000
Bonds, mortgage	648,240,866
Total bonds	$671,240,866
Debentures	$7,183,945
Notes, secured	$32,282,750
Notes, unsecured	8,014,279
Total notes	$40,297,029
Equipment obligations	$140,048,515
Receivers' certificates	$3,790,000
Grand total securities	$907,777,854

Under paragraph (9) of section 20a certificates of notification of the issue of notes, maturing within two years, in the aggregate sum of $78,270,290, were filed.

Reimbursements of Deficits During Federal Control

In our last report we stated that 365 carriers had filed claims for reimbursement under section 204 of the transportation act, 1920, claiming an aggregate amount of approximately $25,775,000. During the past year 32 additional claims have been filed, increasing the amount approximately $1,514,000. Final settlements with 16 carriers have been effected in the gross amount of $698,-132.80. Of the latter amount, $40,332 was withheld under the provisions of the urgent deficiency act of May 8, 1920, as traffic balances and other indebtedness due the director general of railroads, as agent. One claim was dismissed, leaving 68 claims awaiting final disposition.

The total amount certified since the effective date of section 204 is $10,108,343. Of this amount $2,319,568 was withheld under the provisions of the urgent deficiency act of May 8, 1920, for obligations as stated above. We estimate that an amount of approximately $5,000,000 will be required to settle the 68 outstanding claims.

As stated in previous reports, 667 carriers filed acceptances of the guaranty provisions of section 209 of the transportation act, 1920. Claims aggregating approximately $657,000,000 have been filed by these carriers pursuant to our order of December 15, 1921, Finance Docket No. 1606, 70 I. C. C. 711. This order excluded from consideration certain elements in effecting settlements under the guaranty for which claims had previously been made.

Of the claimed amount of $626,637,428 made by 621 carriers whose claims have been finally disposed of, the sum of $133,606,697 has been disallowed under our established procedure. These adjustments were due to accounting corrections relating to the test and guaranty periods; adjustments under section 4 of the Federal control act with respect to interest on additions and betterments; maintenance claims not allowable under paragraph 3 of subdivision (f), section 209; disproportionate items pursuant to paragraph 5 of that subdivision; deductions on account of unaudited items as provided in section 212; and special claims not recognized under our procedure.

Since the effective date of section 209 we have issued certificates in final settlement with 494 carriers, aggregating $493,030,731, and have certified as advances and partial payments to the 46 carriers whose claims remain unsettled an aggregate amount of $35,808,048. We have dismissed 127 claims of carriers held not entitled to benefits of the guaranty.

Certificates have been issued in the following aggregate amounts:

Period	Advances under section 209 (h) and (i)	Partial payments under section 209 (g) and (i) as amended by section 212	Final settlement under section 209 (g)	Total
Amounts certified for payment as of Oct. 31, 1924	$263,935,874	$169,441,912	$74,116,425	$507,494,211
Amounts certified during the year ended Oct. 31, 1925	None	None	21,344,568	21,344,568
Grand total	$263,935,874	$169,441,912	$95,460,993	$528,838,779

The estimated balance payable to carriers under section 209 is $3,161,221.

Loans to Carriers

Our only activities during the year in connection with the revolving fund created under section 210 of the transportation act, 1920, have been in the exchange, substitution, or release of collateral pledged with the Secretary of the Treasury, and the denial of one pending application.

The total amount of repayments of principal of outstanding loans during the year is $9,984,599.

TWELVE AND A HALF CENTS out of every dollar of the combined income of the American people during the past year went into taxes, according to a study in taxation made by the National Industrial Conference Board, New York. The total burden of federal, state and local taxes has nearly doubled in proportion to national income since 1913, rising from 6.9 per cent in 1913 to 12.5 per cent in 1924, also showing an increase over the preceding year, 1923, when the total tax burden amounted to 11.8 per cent of the national income.

Cologne-Berlin Express Pulled by a Three-Cylinder Mikado

Lackawanna Refrigerator Car Which Weighs 55,200 lb. and Has a Capacity of 80,000 lb.

D. L. & W. Fruit Refrigerator Cars

Special attention given to air circulation and insulation— A. R. A. standards closely adhered to

By P. Alquist

Master Car Builder, D. L. & W., Scranton, Pa.

A SHORT time ago the Delaware, Lackawanna & Western received 300 refrigerator cars which represent the latest improvements and A.R.A. standards. These cars were built by the American Car & Foundry Company, at its Berwick, Pa., plant. They are 42 ft. 6 in. long and weigh 55,200 lb.; stenciled capacity, 80,000 lb. These cars were designed for the most difficult requirements of fruit transportation. Bananas are now being received at the Port of New York in a fleet of well insulated vessels. The railroads are called on to transport this fruit during the summer and winter months to distant inland cities in refrigerator cars without the use of stoves en route, maintaining a temperature during the winter months between 55 and 66 deg. F., as bananas will chill below this minimum. This is accomplished by preheating the cars at the ship side by the use of stoves which are removed after the cars are loaded. The condition in which fruit arrives at its destination depends on the construction and insulation of the car, as well as the tight fit of ice hatches and side doors.

During the summer months maximum ventilation is required in order to remove the heat generated by the fruit and to retard ripening. This is accomplished by direct ventilation with maximum air space through the ice hatches and bunkers, eliminating the usual splash board and using high floor racks. In extreme warm weather, long distance shipments require light icing. The cars have hinged floor racks, and sections fold back at the doorway and near the ice bunkers to permit the loading of merchandise on the return movement, if not needed for perishable commodities requiring icing.

The cars are provided with steel underframes consisting of two standard A.R.A. center sills of 12-in. special rolled channels, weighing 40.3 lb. per foot. These are held together by a ⅜-in. by 20-in. cover plate. The side sills are composed of 8-in. shipbuilding channels, weighing 17.6 lb. per foot, with a 3-in. by 4-in. by 5/16-in. angles riveted to the outside to receive the wood side sills to which the side frame of the car is secured. The end sills are made of 9-in. channels weighing 15 lb. per foot, reinforced on the back with 3-in. by 3½-in. by 5/16-in. angles to receive the wooden floor stringers. The body bolsters are of the built-up type with cast steel center fillers. The needle beams are of the built-up type with the top and bottom cover plates ½ in. by 12 in., riveted to the center sill channels and two 5/16-in. pressed steel fillers placed between them with the ends riveted to the side and center sill channels. A 3-in. by 3-in. by ¼-in. angle is riveted to the web of the pressed steel fillers and under the side of the top cover plate.

Each corner of the underframe is reinforced by a 4-in., 8.2 lb., Z-bar diagonal brace. There are also six pressed steel pans ⅜ in. thick, extending from the center sills to the side sill channels, spaced between the needle beams and the body bolster and at the center of the car for additional supports to the wooden floor stringers.

The trucks are of the Bettendorf "U" section type, provided with the Barber lateral motion device. Cast steel truck bolsters are used. Davis cast steel wheels, Creco four-point brake beams and Schafer pressed steel "U" type bottom connections with self-locking hangers are used. All the brake pins are fastened with positive brake pin locks.

Practically the entire superstructure is built of Doug-

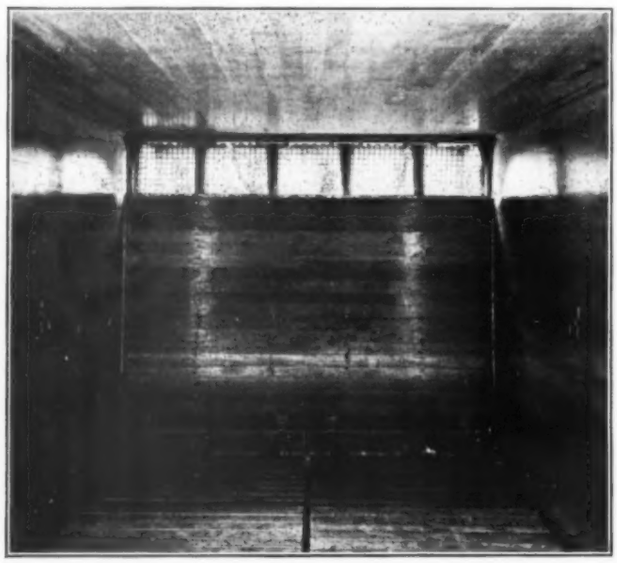
las fir. Thirteen pressed steel Standard Railway Equipment Company Z and U carlines of 13/16-in. material, are used in connection with No. 22 gage outside XLA metal roof. The side doors are equipped with Miner door fasteners, La Flare insulation and L. & N. automatic open door fasteners. Equipco, all-metal, pilferage-proof bulkhead and ice grates with a special enlarged opening over a well insulated bulkhead is used to insure maximum ventilation. The hatch frame covers and plugs are the same as U. S. R. A. Drawing No. 1390, but with the plug detached in order to obtain full opening when required. The side wall insulation consists of

13/16-in. T. & G. lining
1/16-in. waterproofing felt
½-in. Insulite
1 -in. Hairinsul
½-in. Celotex
13/16-in. tongue and groove sheathing

The end walls are substantially the same. The roof carries an additional layer of 1-in. Hairinsul and the flooring is as follows:

1¾-in. T. & G. top flooring
1/16-in. waterproofing felt
½-in. Celotex
¼-in. Unarco waterproofing compound
1½-in. cork
13/16-in. sub-flooring

A.R.A. Type "D" couplers with a 6-in. by 8-in. shank with Universal yokes, cast steel draft lugs and Cardwell friction draft gear type G-111-AA are used. The air



Equipco All Metal Pilferage Proof Bulkhead and Ice Grates with a Special Enlarged Opening to Insure Maximum Ventilation

brake equipment consists of Westinghouse air brake schedule KC-1012, K-2 triple valves, double-spring retainers with Universal booster in the hand brake to give 3,950 lb. at the brake cylinder push rod connection to the cylinder lever. Wine Railway Appliance Company safety first ladders with Viloco step treads were used.

The following are the general dimensions of these cars:

Length over buffers	42 ft.	6	in.
Length over end sheathing	41 ft.	10⅛	in.
Length over end framing	41 ft.	8½	in.
Length inside of lining between ice boxes	33 ft.	11	in.
Width over eaves	9 ft.	5	in.
Width over side sheathing	7 ft.	3¼	in.
Width over side sills	7 ft.	1⅜	in.
Width inside of lining	8 ft.	2¾	in.
Width of door opening	4 ft.	0	in.
Height of door opening	6 ft.	4⅛	in.
Height from rail to eaves	12 ft.	2⅝	in.
Height from coil over all	13 ft.	7¾	in.
Height from top of floor to the ceiling	7 ft.	5¼	in.
Cubic feet capacity	1,958		

U. S. Treasury Accounts with the Railroads

WASHINGTON, D. C.

THE annual report of Secretary Mellon of the Treasury Department says that it now appears that the estimate made by Director General Davis of the Railroad Administration of the cost to the government of federal control of the railroads and the six months guaranty for 1920 will prove to be substantially correct.

According to the records of the Treasury the net cash outgo on account of federal control to June 30, 1925, amounted to $1,799,920,784. If the principal amount of obligations of carriers acquired by the director general and held by the Treasury on the above date is deducted, the net cost will be $1,664,683,784. Approximately $9,000,000 must yet be paid under the provisions of sections 204 and 209. The estimate, however, does not take into consideration the difference between interest costs on funds borrowed by the government for railroad uses and the interest received on obligations acquired by the director general.

The total principal amount of railroad obligations owned by the government on June 30, 1925, which were acquired under the federal control act and the transportation act, 1920, as amended, was $316,300,324 as against $449,377,995 on June 30, 1924. During the fiscal year ended June 30, 1925, the Treasury received from the director general of railroads additional obligations of carriers aggregating $5,119,000 principal amount acquired under the provisions of section 207 of the transportation act, 1920, as amended. During the same period the principal amount of obligations of carriers was reduced by $138,196,671, a net reduction of $133,077,671. The substantial reduction of obligations held was chiefly due to sales made by the director general of equipment trust notes acquired under the federal control act and the act of November 19, 1919, and obligations acquired under the provisions of section 207 of the transportation act, 1920, as amended. Due to the improved credit position of some carriers and also on account of easier money conditions, bankers found it possible to purchase a substantial amount of these obligations and resell them to the investing public. There were also a few carriers which were able to refinance in the investment market at rates better than 6 per cent their outstanding loans under section 210 of the transportation act. This brought about a considerable reduction in the principal amount of obligations of this class held by the government.

On the basis of the daily Treasury statements the net cash receipts on account of railroad obligations during the fiscal year total receipts less total expenditures amounted to $136,706,428 as against the estimated net receipts of $88,266,511 included in the budget, an increase over the estimate of $48,439,917. The total receipts from railroad securities during the fiscal year were $143,911,421. of which $121,131,683 was on account of principal and $22,779,738 on account of interest. The total net expenditures during the fiscal year were $7,204,993.

Under the transportation act net payments made during the fiscal year for reimbursements of deficits under section 204 were $720,968, net guaranty payments under section 209 were $22,925,984, while no new loans were made under section 210. The total payments by the Railroad Administration during the fiscal year of $5,479,372 were more than offset by receipts of $21,921,331, leaving excess receipts on account of federal control of $16,441,959. Some carriers made cash payments to the director general on account of final settlements with him instead of funding

their indebtedness through delivery of their obligations.

During the period from July 1 to October 31, 1925, the proceeds of railroad securities received by the government amounted to $11,738,822, while net expenditures were only $2,306,282, an excess of receipts for the period amounting to $9,432,540. Of the $11,738,822 received, $5,331,039 was on account of principal and $6,407,783 on account of interest.

The payments under sections 204, 209, and 210 of the transportation act, 1920, as amended, are made by the Treasury in accordance with certificates issued by the Interstate Commerce Commission.

The balance to the credit of the revolving loan fund at the close of business on October 31, 1925, was $145,854,750.15.

From November 1, 1924, to October 31, 1925, 8 railroads paid their loans in full and 18 reduced their loans. Nine have defaulted in interest payments, and 3 have defaulted in payments due on account of principal. The following is a list, as of October 31, 1925, of the carriers in default in respect to loans made under this section:

Name of carrier	Principal	Interest	Total
Atlanta, Birmingham & Atlantic Ry. Co.	$80,000.00	$42,243.72	$122,243.72
Gainesville & Northwestern Railroad Co	.....	11,250.00	11,250.00
Kansas City, Mexico & Orient Railroad Co. (receiver)	2,500,000.00	492,095.83	2,992,095.83
Minneapolis & St. Louis Railroad Co..	.....	185,387.00	185,387.00
Missouri & North Arkansas Ry. Co...	.....	364,718.72	364,718.72
Salt Lake & Utah Railroad Co.....	15,700.00	52,422.55	68,122.55
Virginia Southern Railroad Co.....	.....	3,420.00	3,420.00
Waterloo, Cedar Falls & North. Ry. Co.	.....	302,400.00	302,400.00
Wichita Northwestern Railway Co....	.....	34,357.50	34,357.50
Total.....	2,595,700.00	1,488,295.32	4,083,995.32

Railway Development Association Meets at Chicago

Taxation, farming, public relations and industrial promotion were given consideration

TAXATION, farming, public relations and industrial development occupied the program at the semi-annual meeting of the American Railway Development Association at the Hotel Sherman, Chicago, on December 3 and 4. Vancouver, B. C., was chosen as the place for the annual meeting to be held in June, 1926. H. W. Byerly, general immigration agent of the Northern Pacific at St. Paul, Minn., was elected secretary.

Public Relations Section Develops Unique Methods

While discussing the establishing and maintaining of satisfactory public relations at the session of the Public Relations section, several methods of reaching the public were described. The Chicago Great Western, under the direction of T. A. Hoverstad, development agent at Chicago, has made arrangements with 100 local newspapers to run advertisements under the condition that the editor of the paper will write the railroad's advertisement. This method was employed because the editor, it was found, would not give the railroads support in editorials due to his lack of knowledge of railroad matters. The ad writing was intended to encourage the editors' interest in railroad affairs. The subjects appearing in the ads have varied greatly. Some described the value of the railroad to the town and citizens, and some credited the railroads with the existence of the community, while others spoke romantically of the railroad and its relation to civilization.

A variation in advertising practices in connection with local newspapers, in effect on the Cleveland, Cincinnati, Chicago & St. Louis, was described by C. A. Radford, publicity manager of that road at Cincinnati. Under his plan, local agents are authorized to place advertising with newspapers in their locality and to pay for it in cash when run. It has been found that this practice has enhanced the degree of co-operation offered by newspapers. The local agent sends a voucher to the accounting department for the amount spent in advertising, and keeps a copy for his records. The advertisements are designed by Mr. Radford, who furnishes the agent with proofs which he has authorized. The plan has encouraged the local agents to take part in the work and several suggestions have been made by the agents.

W. E. Babb, assistant director of public relations of the Chicago, Rock Island & Pacific, at Chicago, spoke upon the institutional committee and described that on the Rock Island. The institutional committee on this road was organized two years ago to create direct points of contact on the lines, not only with newspapers and other publications, but with local commercial clubs and other civic and business organizations, that would aid in bringing about a better understanding of the inter-dependents of the railroad and the communities it serves. The committee is made up of employees and officers whose duties bring them more or less in contact with the public. The committee on the line is picked by divisions, with supervisory leaders selected by districts and a general advisory board at headquarters, the last named to function only in emergency when a matter of general policy is to be determined. The advisory board is composed of the president of the road and members of his executive staff. The committee is composed of 809 members, covering 8,000 miles of line in 14 middle western states and the majority of the members are below the rank of officer. In addition, some of the pensioned employees are on the committee.

Industrial Section Urges Development of Natural Resources

A paper by E. P. Pace, land and industrial commissioner of the Gulf Coast Lines-International-Great Northern, favored the development of natural resources. The discussion following the paper was in sympathy with it but urged that materials other than those which were being sought be investigated and analyzed also. Examples were cited where a particular substance was sought and it was later found that another substance could have been developed that was superior to the one being sought. It was felt that the railroads' industrial departments should co-operate with chambers of commerce as they are continually asking for resources that can be developed as an aid to the growth of the community. The members felt that the railroad's investigation of natural resources

should not interfere with commercial or municipal investigations that might also be made.

During the discussion of taxation there were two views as to whether the railroads should take a hand in taxation matters. Those opposed felt that such action would bring the railroads into politics while others felt that by taking action the railroads would be able to counteract some of the influences working against them. It was found that in some localities farmers on taxation boards felt that the railroads should pay more taxes in proportion than the farmers and levied the taxes accordingly. In one locality a railroad was forbidden to abandon a small part of its line, not because the locality desired the freight or passenger service, but because the community desired the taxes paid by the railroad. The section recommended that the plan of economy practiced by President Coolidge be applied to municipalities and that the number of boards and commissions be reduced.

As a method of promoting industrial development, it was recommended that industrial men endeavor to prevent homes or houses from being built along the railroad's right-of-way in order that the property might be utilized for industries which require industrial tracks. Among the cities which are endeavoring to further the development of industries, Cincinnati, O., and Dayton were mentioned. These cities have created boards and raised money through contributions to investigate the industrial shortcomings of the city, to determine the classes of industry needed and to outline methods of securing such enterprises. The investigation covered a three-year period.

Co-operation Will Solve Taxation Problems

Taxation as it affects railroads and farmers was discussed by T. A. Dyer of the Ohio State Farm Bureau who stated that the co-operative effort of all industries is needed in a more intense degree to solve the taxation problems which affect the economic stability of the country. "Lower taxes and less legislation," he said, "cannot be brought about unless there is a greater co-operative effort to solve the taxation and debt control problems applying to government. If more attention were paid to limiting the debt-incurring powers of governing bodies the cost of government would be less. In the state of Ohio the cost of government has been lowered by limiting debt-incurring powers. This has affected our agricultural industries to such an extent that we can say that the Ohio farmers are prosperous. To aid in the continuance of this prosperity 147 corrective measures have been passed that will help the farmers either directly or indirectly.

"Business generally, including all industries, manufacturing and transportation, can solve a large number of the taxation problems that are hurting them if they will but get together and give closer supervision to the debt-incurring powers of government bodies. Industrial and commercial leaders must pay more attention to the business of government if they would solve taxation problems."

Co-operation of Railroads in Industrial Development

T. C. Powell, president of the Chicago & Eastern Illinois, urged the railroads to work together for a more even development of the country as a whole while they are engaged in developing the industries which directly pay the railroads returns in the form of increased traffic. He pointed out that a railroad is not a charitable institution, it should not try to locate an industry which has not a reasonable chance of success, it should not buy or sell property which it believes will not produce freight or passenger traffic, and it should not build up suburban property merely for the increase in value.

"Railroads cannot change the natural disabilities of a section by establishing unduly discriminatory rates in favor of any location or by a scheme of rate adjustment to make profitable a farming enterprise without natural justification," he said. "They cannot overcome by any legal adjustment of rates poor business methods or the mistakes of inexperienced farmers.

"They can become a partner in a broad sense in all legitimate enterprises, farming operations and merchandising operations by giving efficient service and reasonable and just rates. They can aid these in emergencies by advice and expert and prompt information."

Agricultural Situation Continues to Improve

H. W. Moorehouse of the Brookmire Economic Service, spoke upon the agricultural situation, describing conditions as sound and showing improvement over last year, in spite of the persistent publicity regarding disaster to agriculture in the corn belt due to declining corn prices. He stated that although corn prices are lower this year, the crop is 20 per cent larger. "Iowa," he said, "has the largest corn crop in its history and Iowa farmers will receive from the sale of corn 10 per cent more income than last year. Livestock will yield as large or larger returns. The total farm income will be bigger than last year which was a good year in Iowa. The corn crop in Illinois was not so big and will yield a little less money than last season. Livestock should return approximately the same, making the total farm income in Illinois a trifle under the previous year.

"On the basis that in the nine principal corn states farmers receive in round numbers 400 million dollars from the sale of corn, 600 million from cattle and 900 million from hogs, the cash returns from hogs and cattle are three times the cash returns from corn sold directly as corn. In these nine states during the 12 months beginning July 1, 1925, and ending June 30, 1926, we estimate the income from the three sources, corn, hogs and cattle, a little above the previous year.

"Northwestern Iowa and eastern Illinois are the most important cash corn areas. Small sections in Ohio, Indiana, Minnesota, South Dakota, Nebraska, Kansas and Missouri also have a fairly large cash corn movement. Individual farmers who grow corn for sale more than for feed, obviously are vitally concerned in the question of the income they receive from corn independently of livestock. Also in limited areas where the crop was poor, the situation is discouraging. Agricultural conditions are always spotted. Viewing the agriculture of the corn belt as a whole, however, there is no sound basis for the alarm over corn prices considered by themselves and in the present situation they are more than compensated for by other factors.

"We believe that the business community may depend upon a well sustained buying movement throughout the central corn states during the coming winter months. In the fifteen years preceding the world war, agricultural prices, agricultural income and agricultural purchasing power were climbing steadily upward. In the pre-war years farm prices, income and purchasing power were in the most favorable position experienced in their history. For the three years 1917, 1918 and 1919, the purchasing power of each farmer and farm worker averaged 25 per cent higher than during the favorable pre-war period. For the three years 1920, 1921 and 1922, farm purchasing power averaged 20 per cent less than in the favorable pre-war period. The lean years were almost, but not quite, as lean as the fat years were fat. There were three fat years and three lean years. In 1923 the pre-war farm purchasing power was regained and in 1924 it was exceeded. This year again on the basis of the purchasing

power of agricultural income agriculture is more favorably situated than during the encouraging years preceding the war.

"We believe the farm situation will improve for two principal reasons. In the 15 years previous to 1913 there were two underlying forces bringing about agricultural improvement. One was the very decided slowing up of the expansion in farm land area. The other was the growth of cities and industries. The one factor lessening the potential supply of farm products and the other increasing the potential demand tended to push agriculture forward and upward. Agriculture will continue to have its ups and downs. It will continue to be spotted as between different areas in any given year. But the trend in agricultural affairs is without question favorable. The two most influential factors at work before the war are operating now and will continue to operate. The purchasing power of each farmer and farm worker can be expected to continue upward."

CONTINUED NEED OF PUBLIC RELATIONS WORK

Samuel O. Dunn, editor of the *Railway Age,* spoke upon the future of public relations and outlined the developments needed in order to enhance railroad progress. His address in part follows:

"The railways within recent years have lost a large amount of passenger business, and their freight business has not increased as much as before the war, but without doubt the growth of traffic will be resumed again on a large scale. There is less danger that they will not in the future have enough business so that their capacity will not be expanded.

"There has been much said, and truly said, regarding the great improvement that has been made recently in railway service. It has made it possible to follow a policy of 'hand-to-mouth buying' which has resulted in reductions in the inventories carried by business concerns of all kinds that have been estimated to aggregate from four to seven billion dollars. This huge capital has been made available for use in other ways. It is not improbable that the increased working capital which, in effect, has thus been made available is equal to one-third of the total valuation of all our railroads, and is saving the public an amount in interest charges on inventories that exceeds the total dividends ever paid by the railways in any year.

"There is no problem of agricultural or industrial development of more importance than the question of what must be done to enable the railways to continue to render such service as has made it possible to thus, in effect, add several billion dollars to the working capital of the nation. If there should suddenly be, as there actually has been recently in Florida and the southeast, a large increase in freight business without any corresponding increase in the capacity of the railways, it would quickly become impossible for them to continue to render their present good service. Furthermore, it would be easy to exaggerate the amount of surplus capacity the railways have had available. They have handled the peak load of this year's fall business while maintaining a surplus at all times of at least 100,000 freight cars, but this surplus is only four per cent of the total number available.

"If their capacity is to be constantly increased there must constantly be large amounts of new capital invested in their properties; if they are to raise this capital they must earn large enough net returns to make their securities attractive; if they are to earn adequate net returns their rates must be so regulated as to enable them to do so; and finally, the way in which they will be regulated will depend upon public sentiment.

"We are led inevitably to the conclusion that the development and prosperity of the country, in so far as it is determined by railway service, will depend upon public sentiment. Public sentiment regarding regulation is more intelligent and favorable now than it has been for many years. The public at last is beginning to see that prosperous railroads are not a national liability but a national asset, just as are prosperous farms and factories.

"The railways, however, unlike farms and factories, are subject to government regulation. This affords an opportunity and invitation for a kind of attacks to be made upon them that cannot be made upon farmers and manufacturers. There is no reason for hoping that efforts will not continue to be made to use the power of government to restrict unduly the rates they may charge and the profits they may make.

"One of the most extraordinary facts in the history of our railways is that many of their higher officers long virtually ignored the influence which public sentiment, acting through government regulation, inevitably would exert upon their operating and financial results and their development. Even yet what must be done to create and maintain a satisfactory public sentiment is by no means as generally understood as is desirable.

"One of the railway leaders of the country a few days ago attributed the improvement in sentiment entirely to the great improvement that has been made in railway service. It cannot be questioned that the unprecedentedly good service that has been rendered within the last three years has been a factor of vital importance. If, however, a product of any kind is to be successfully marketed it is necessary not only to make it good, but to convince prospective purchasers that it is good. This can be done only by the use of the arts of salesmanship. The improvement in sentiment toward the railways is due partly to the improvement in the service, and partly to the unprecedented efforts that have been made within recent years to 'sell' the railways and their service to the public. If a larger amount of public relations work had not been done than ever before, if the attention of the public had not been constantly called to the increases in the efficiency of operation and the improvements in service that have been made, if the problems of railway development, operation and regulation had not been presented in addresses, in advertising, in publicity material and otherwise as they have been, the public would have given almost no thought to what the operating departments of the railways have achieved, and public sentiment would be little or no better now than it was in past years.

"Excepting in western territory, the railways are now about as prosperous as they were before the war, and this bespeaks a great achievement, because less than five years ago they were suffering from the most profound adversity they ever experienced. We are now confronted in the larger part of the country with the problem of how they may be kept prosperous. It will prove more difficult to keep prosperity than it has been to get it if there is any slackening of efforts to maintain public friendship and understanding, and already there has been a slackening of such efforts. Some railways are going ahead energetically with public relations work of various kinds, but this is not true of all. No railway will permanently do work of this kind well unless able and well-paid men are definitely assigned to specialize upon it. The executive, the operating, the traffic officers are so intensely interested in other work that only in emergencies can most of them be depended upon to devote much thought or effort to public relations work. What is needed is not to deal, as in the past, with emergencies created by the manifestations of hostile sentiment, but to prevent the recurrence of such emergencies by preventing the growth of such sentiment.

"The first requisite to preventing the growth of hostile

sentiment is to have officers of the railways who will keep constantly in contact with all classes of patrons, who will listen to their complaints and criticisms, who will study the trend of public sentiment, and who will accurately and fully report regarding such matters to the higher officers. There are no men who have better opportunities to do these things well than the development officers. Every railway is organized to get information regarding crop prospects and conditions of every kind that will aid in anticipating probable traffic for months and even years ahead. It plans its programs of maintenance, of additions and betterments and for the purchase of equipment in accordance with this information. But knowledge of the condition and trend of public sentiment, of the influences that are making it worse or better, of what the public's attitude is or is likely to be regarding present or proposed policies of regulation, surely is quite as essential to the successful conduct of a railway as information regarding prospective business. Under our system of regulation the volume of business and the efficiency with which it is handled are no more important in determining the net returns that are earned than is the public sentiment which in the long run dictates the policy of regulation followed regarding operation, rates, financing and competition with other means of transportation.

"One suggestion that is therefore offered to the development officers is that they make it an important part of their work constantly to investigate and study public sentiment, and to report to their higher officers frequently and accurately the exact results of their observations. The higher officers can come in direct contact with only a few people, and from the nature of things those with whom they do come in contact are not likely to give them a true cross section of public sentiment.

"The best kind of public relations work is that which shows to the passenger, the farmer or the business man that the railway is sincerely anxious to do for him and all its patrons everything it legitimately can that will be beneficial to them, and to co-operate with them in everything that will contribute to the well-being of every person and community that it serves. It is not only the thing that is done that counts, but the manner and spirit with which it is done. One of the best pieces of public relations work was done by certain railways that traded farmers pure bred bulls for grade bulls. The way in which the question of furnishing a switch track is handled may make the difference between a friendly and an unfriendly patron. The advertising done to exploit to the world the natural resources of the territory that a railway serves may easily make it more friends than advertising of its own service. Few things are so important in making friends for a railway as active participation by its officers and employees in the business and even in the social activities of all its communities, large and small.

"When one contrasts the difference between the ways in which the selling work of most railways and most other kinds of concerns has been done he is apt to conclude that the railways have been greatly understaffed in the department of hand-shaking. The co-operation of the railways with the shippers through the Regional Shippers' Advisory Boards has been of such value not only because it has helped to secure a better distribution and movement of freight cars, but because it has brought railway officers into close personal contact with literally thousands of leaders in every line of business in every part of the country. Many farmers and business men who had hardly ever met a railway officer before they sat in the meetings of the Regional Shippers' Advisory Boards, or worked on their committees, have made the discovery that railway officers are a lot of good fellows and able men who are as anxious to give their patrons what they need as their patrons are to get it. Whatever railway officers do or say to increase the number of people who think this way will contribute in a substantial measure toward the solution of the railway problem, which is simply the problem of making and keeping the railways a reasonably prosperous industry.

"A large part of our railway officers received their training under a regime one of whose main principles was that the man who did things and did not talk about them was the really great man. The fact must be frankly and fully accepted that through their officers, high and low, the railways must in future constantly talk about their business to the public, in addresses, in advertising, in interviews and so on. If we are to have fair and constructive regulation there must be public understanding of what the railways are doing, are trying to do and should be allowed to do, and there will never be such public understanding very long unless the railways make it a part of their regular work to talk to the public about their business.

"The development officers of the railways can make a contribution of great importance not only by representing the railways to the public, but also by representing the public to the railways. Experience has shown it is quite as important for the railways to know what the public is thinking and what it wants as for the public to know what the railways are doing and want to do."

I. C. C. Proposes Change in Consolidation Law

WASHINGTON, D. C.

AMENDMENTS of the consolidation provisions of the present law to omit the requirement of a complete plan of consolidation, but to give the Interstate Commerce Commission broad powers to approve or disapprove of consolidations or acquisitions of control of railroads, is the principal new recommendation made by the commission in its annual report to Congress. In its last report the commission stated that the work of preparing the complete plan was progressing, but on February 4, 1925, the commission addressed a letter to the chairman of the Senate committee on interstate commerce in which the majority of the commission expressed doubt as to the wisdom of the provisions of the law which require it to adopt a complete plan to which all future consolidations must conform. They further stated that they had been impelled to the belief that results as good, and perhaps better, are likely to be accomplished with less loss of time if the process of consolidation is permitted to develop, under the guidance of the commission, in a more normal way, and a proposed amendment to section 5 of the interstate commerce act was attached to the letter.

Recommendations

For the reasons stated in this report and in former reports the commission recommends:

For the reasons stated in this report and in former reports the commission recommends:

1. That section 1 of the interstate commerce act be amended to provide for the punishment of any person offering or giving to an employee of a carrier subject to the act any money or thing of value with intent to influence his action or decision with respect to car service, and to provide also for the punishment of the guilty employee.

2. That subject to appropriate exceptions the use of steel or steel underframe cars in passenger-train service be required, and that the use in passenger trains of wooden cars between or in front of steel or steel underframe cars be prohibited.

3. That the hours of service act of March 4, 1907, be so

amended as to require all service of employees subject to the act to be construed as continuous service, except that if an employee is given a release from duty for a definite period of not less than three hours, and under such circumstances that the employee has proper facilities and opportunities for securing rest during such relief period, such relief period can be used to break the continuity of the service and the service ceases to be continuous and becomes aggregate service.

4. That section 20a of the interstate commerce act be amended to include within its provisions electric railway companies engaged in the general transportation of freight.

5. That paragraphs (2) to (6), inclusive, of section 5 of the interstate commerce act be amended: (*a*) by omitting therefrom the existing requirement that we adopt and publish a complete plan of consolidation; (*b*) by making unlawful any consolidation or acquisition of the control of one carrier by another in any manner whatsoever, except with our specific approval and authorization; (*c*) by giving us broad powers upon application and after hearing to approve or disapprove such consolidations, acquisitions of control, mergers, or unifications in any appropriate manner; (*d*) by giving us specific authority to disapprove a consolidation or acquisition upon the ground that it does not include a carrier or all or any part of its property which ought to be included in the public interest and which it is possible to include upon reasonable terms; (*e*) by modifying subparagraph (*b*) of paragraph (6) so that the value of the properties proposed to be consolidated can be more expeditiously determined; and (*f*) by providing that in the hearing and determination of applications under section 5 the results of our investigation in the proceeding on our docket known as No. 12964, *Consolidation of Railroads,* may be utilized in so far as deemed by us advisable.

6. That section 25 of the interstate commerce act be amended by making it unnecessary for common carriers by water in foreign commerce to file, and for us to publish, the information referred to in paragraph (1) of the section.

7. That section 26 of the interstate commerce act be amended by making it the duty of every common carrier designated in that section to furnish all reasonable facilities to the engineers or other employees of the commission for inspection, at any stage, of installations of the safety devices provided for by that section, and for that purpose to furnish such employees, when properly identified, with transportation upon the locomotives or freight trains of the carrier at such reasonable compensation as may be fixed from time to time by the commission.

8. That section 19 of the merchant marine act, 1920, be amended so that its provisions will clearly not be applicable to the Interstate Commerce Commission, that section 27 of this act be reconsidered by the Congress in the light of this report, and that section 28 of this act be reconsidered by the Congress in the light of the circumstances set forth in the chapter on the effect of this statute appearing at pages 13 and 14 of our thirty-fifth annual report to the Congress. In this connection reference is made to our report dated June 29, 1922, to the chairman of the Committee on Interstate and Foreign Commerce on H. R. 12021, Sixty-seventh Congress, second session.

9. That Senate Resolution 438, passed February 26, 1923, be rescinded. (This resolution required the commission to submit to the Senate monthly reports of equipment condition.)

10. That section 204 of the Transportation Act, 1920, be so amended as to provide that no carrier shall be entitled to the benefits of that section unless claim therefore shall have been filed by the carrier with the commission within a reasonable time, say six months, after approval of the amendment.

The Proposed Consolidation Amendment Explained

The following explanation of the proposed consolidation amendment is quoted from the letter to the Senate Committee:

Briefly the amendment would accomplish the following results:

(1) Relieve the commission from its present duty of adopting a complete plan of consolidation.

(2) Make unlawful any consolidation or acquisition of the control of one carrier by another in any manner whatsoever, except with the specific approval and authorization of the commission. The purpose of this provision is to make certain that the process of consolidation will in all respects be subject to the control and guidance of federal authority. Without such a prohibition it will be claimed that such consolidations or acquisitions of control as are not in conflict with the federal antitrust laws may be effected, as was done in the Nickel Plate case, under state authority and without federal approval. Whatever the merits of the Nickel Plate consolidation, it must be obvious that the possibility of consolidations or acquisitions of control thus consummated means a division of authority and responsibility which is likely to be destructive of any well-ordered and consistent control of the process of consolidation in the public interest.

(3) Give the commission broad power to approve or disapprove such consolidations or acquisitions of control as are proposed. Before approving the commission must find that the consolidation or acquisition—

(*a*) Will be in the interest of better service to the public, or economy in operation;

(*b*) Will not unduly restrain competition or be in any other material respect inconsistent with the public interest; and

(*c*) Will conform to the provisions of paragraph (4), which prohibit a capitalization of the consolidated company in excess of property value.

It may seem unduly drastic to require a finding that the consolidation or acquisition will not be inconsistent with the public interest in any material respect, but it will be noted that the commission is not restricted to the approval or disapproval of the consolidation or acquisition as proposed, but is authorized to approve "with such modifications and upon such terms and conditions" as it shall find just and reasonable. If what is proposed will promote the public interest in certain respects but not in others, it need not be wholly rejected but may be approved in a modified form which will eliminate the objectionable features.

(4) The commission is specifically authorized to disapprove a consolidation or acquisition upon the ground that it does not include a carrier, or all or any part of its property, which ought to be included in the public interest and which it is possible to include upon reasonable terms. One of the criticisms of such consolidations or acquisitions as have been proposed or suggested has been that they do not take care of the weak lines, although the merger of weak with strong lines is one of the ends which Congress has apparently had in mind. The specific provision above described will, it is thought, enable the commission to require attention to be directed to this phase of the matter, which otherwise might be neglected. The commission is also specifically authorized to make it a condition of any consolidation or acquisition that "existing routes and channels of trade and commerce shall be maintained." This provision has been inserted to remove such doubts as have been raised with respect to our power to attach such a condition.

(5) The commission is required to preserve "all records and other evidence heretofore taken and now in the files of the commission, under the terms of this section as heretofore enacted" and is authorized to utilize such records and evidence in reaching its conclusions with respect to any consolidation or acquisition proposed. This provision will enable the commission to avail itself of the very valuable information which has been gathered in connection with the consolidation plan proceeding.

(6) The provision now in subparagraph (*b*) of paragraph (6) of section 5 has been retained in somewhat modified form. This is the provision which limits the total capitalization of the consolidated company to the value of the combined properties. The thought underlying the modification is that it may be possible to determine value for the purposes of this provision more expeditiously than is possible under the valuation procedure prescribed in section 19a. It should be understood, however, that even with this modification this provision is likely to cause material delay in the process of consolidation. The safeguard provided by the provision is a desirable one and the question which must be faced is whether delay in accomplishing consolidations is more objectionable than the absence of such a safeguard.

Fenwick, Ont., on the T. H. & B.

Hearing on N. Y. C. Train Control Contract

Two officials said to have held stock in signal company—Sprague charges unfair treatment—Further hearings

WASHINGTON, D. C.

TESTIMONY that H. S. Balliet, signal engineer and assistant terminal manager of the electric zone of the New York Central, held ten shares of stock in the General Railway Signal Company from April to September, this year; that W. S. Baker, assistant to vice-president of the New York Central, was also a stockholder in the signal company, and that A. H. Harris, vice-president of the New York Central, was formerly member of a law firm, the predecessor of the firm that now represents the signal company as counsel, and that these were the facts on which the Sprague Safety Control & Signal Corporation based its charge "on information and belief" that the New York Central had violated section 10 of the Clayton anti-trust law in awarding a contract for the installation of the G. R. S. automatic train control on its lines, was presented before Division 1 of the Interstate Commerce Commission on December 5 at the hearing on the Sprague company's complaint. Frank J. Sprague, president of the company, also testified that these facts, together with the spectacular rise in the market quotations on the signal company's stock during the period within which the contract was made, and during a period of some four weeks which he said had elapsed before the contract was publicly announced, led him to believe that "sinister influences" were involved in the award of the contract without notification to him, after he had made extensive tests with the Sprague device on the New York Central, and had caused him to file with the commission his complaint and request for an investigation.

Testimony bearing on the alleged violation of Section 10 of the Clayton law was introduced only after several hours of heated argument by counsel, in which C. C. Paulding, assistant vice-president of the New York Central, and W. A. Matson, counsel for the G. R. S. company, had insisted that the evidence in support of the criminal charge be brought forward, while Ellwood Colahan, counsel for the Sprague company, insisted on first presenting Mr. Sprague's testimony regarding what he termed his unfair treatment by the New York Central. When the commissioners finally ruled that the direct evidence should be produced, after Mr. Paulding had argued that testimony regarding the contract was irrelevant unless preceded by a showing of some interlocking relation between the companies, Mr. Colahan called as a witness Mr. Matson, who gave the testimony regarding Mr. Balliet's holding of stock and regarding Mr. Harris' former connection with the law firm. Mr. Matson also offered to testify regarding a list of 56 directors and officers of the New York Central which he had agreed to check against the stock list of the signal company to avoid disclosing the entire list but was not given an opportunity, and Mr. Sprague resumed his testimony. Mr. Paulding insisted on cross-examining Mr. Sprague as to the basis for his charge, before any adjournment should be taken, and Mr. Sprague named Mr. Baker, Mr. Balliet and Mr. Harris as being the only persons connected with the New York Central he had in mind as having a "substantial interest" in the signal company.

In reply to Mr. Paulding's questions as to his purpose in instituting the proceeding Mr. Sprague said that he had no hope of compelling the New York Central to enter into a contract with him, but that he wished to lay bare the facts as to the award of the contract without notification to him of a change of the conditions, specifications and requirements to which he had been held, and because he believed "that sinister influences were back of this suppression of information of competition."

Under steady insistence by Mr. Paulding on testimony as to the "sinister influence" and his sources of information, and over objections by Mr. Colahan to stating the particulars on which the charge as based, Mr. Sprague said that on his return from a long absence about August 6 he had been informed that the New York Central had made a contract with the General Railway Signal Company on July 10 for a device not including the features which the officers of the road had called essentials in their negotiations with him, that the contract was announced in the press on August 7, that his attention was called to the remarkable rise in the preceding two months in the stock of the signal company and to a circular which contained the name of the firm of Harris, Beach, Harris & Matson as counsel for the signal company, and that he had been informed that A. H. Harris was a member of the firm. He had also been informed that at least two New York Central men were stockholders of the signal company. He said he had made such investigation as he could of this information and had then signed the allegation in the complaint "on information and belief," seeking a further investigation by the commission. He said the city directory of Rochester, N. Y., gave the name of Mr. Harris as a member of the law firm and that while he had not believed strongly that he had exercised an influence on the contract he thought that if he were a member of the firm he had a "substantial interest." He said he did not know that Mr. Baker had anything to do with the contract but that Mr. Balliet was a member of the New York Central Lines train control committee. He produced some advertisements of brokerage firms calling attention to the rise in the price of G. R. S. stock, which he said went up from 110 on April 28 to 395 in six months, and he produced a chart showing the movement of the stock, which he said indicated knowledge on the part of interested parties prior to public knowledge. Mr. Paulding read a list of the directors and officers of the road and after a good deal of wrangling Mr. Sprague said he was not aware of any connection with the signal company on the part of any except those named. The hearing was then adjourned and Commissioner McChord said it would be resumed as soon as possible, but probably not this month.

The testimony for the first two days of the hearing, which began on December 2, was given by witnesses on behalf of the New York Central, in rebuttal of the charge that the G. R. S. device is unsafe. Cross-examination by Mr. Colahan indicated that the principal basis for the claim that the device is unsafe was the fact that it includes the forestalling feature; but the witnesses

for the road defended that feature as necessary to avoid delays and perhaps damage to trains caused by too many sudden automatic stops; and they insisted on the importance of keeping the engineman in control of his train as long as he is alert.

The New York Central, which by accepting the burden of proof, had been allowed to present its evidence relating to the adequacy of the train stop ahead of the evidence on behalf of the complainant, concluded its case about noon on December 4. Mr. Colahan then asked for an adjournment for several days because of Mr. Sprague's other engagements, but Mr. Paulding objected to the charge of violation of the Clayton law being left "up in the air" and it was decided that complainant should take up that part of its evidence before adjournment.

Most of the afternoon session, however, was taken up with argument on objections by Mr. Paulding to testimony being given by Mr. Sprague regarding the tests and the contract, until after evidence had first been introduced to show that the transaction complained of was such a one as is covered by section 10 of the Clayton law. Mr. Paulding read the section to show that the requirement of competitive bidding applies only to transactions between railroads and other companies which have an interlocking interest, but Mr. Colahan insisted on first presenting other matters "to show the atmosphere."

Mr. Sprague began by saying that he had not been furnished any specifications by the New York Central for the installation for which a contract was made with the General Railway Signal Company, that he was not given an opportunity to bid, and that he had no knowledge of any change in the requirements since the specifications of November, 1924. Mr. Paulding objected to questions along this line, saying that it was not incumbent upon the New York Central to give him any information whatsoever; and he asked that the testimony be limited strictly to facts that would show a violation of section 10. Comissioner McChord ruled that the witness might answer counsel's questions. Mr. Colahan then asked whether anything had been said in Mr. Sprague's negotiations with the New York Central about a plain automatic stop with forestalling feature. Mr. Paulding again objected.

Mr. Colahan insisted that the facts he desired to show were relevant and that, while he admitted a close question of law was involved, he had been placed somewhat at a disadvantage by being required to offer his evidence as to section 10 before the other parts of his case. He then renewed his request for an adjournment, saying that he might give the names involved so that the New York Central might not be taken by surprise. Mr. Paulding objected to a statement by counsel on that point and insisted on the names being given by a witness who might be cross-examined. He contended that until it shall appear that the the transaction was one such as is covered by section 10, the commission is without jurisdiction. Commissioner McChord said that whether the commission is or is not to certify anything to the attorney general, it has an ever-present duty under section 12 of the interstate commerce law to keep itself advised as to how railroad managements are conducting their business, and that the witness might proceed. Later the commissioners retired and afterward came back with a ruling that, as what the witness might say might be relevant to the other part of the case, he might proceed, subject to the right to move to strike out the testimony.

Mr. Colahan then asked Mr. Sprague to explain the differences between contact and inductive and intermittent and continuous types of train control. When Mr. Paulding renewed his objection Mr. Colahan said he objected to being limited to specified sections of the law; that the facts might involve violations of sections other than those mentioned, and he asked that the complaint be amended to allege violation of section 3 of the commerce act. This is the section which prohibits preference to particular persons, places, localities or descriptions of traffic, under which cases of rate discrimination are tried. Mr. Colahan said he desired to show that Mr. Sprague had been treated most unfairly after having been led along for months and having spent hundreds of thousands of dollars in extensive tests.

Mr. Sprague testified that the tests on the New York Central were made at the request of the automatic train control committee of the American Railway Association, and that he had first insisted on being assured of a contract for a division if he succeeded. He was told that the committee could guarantee nothing, as it had merely asked the New York Central for an opportunity for the test; but that if it resulted successfully Mr. Sprague would be in a particularly favorable position. He had entered into a contract with the New York Central on October 11, 1921, providing for the test. Mr. Paulding said the contract was made at the request of Mr. Sprague and the American Railway Association, not at the request of the Central, and that it had very reluctantly agreed to pay $40,000 of the cost of the test. Commissioner McChord remarked that he recollected that the road demurred strenuously to paying any part of it.

When 4:30 p. m., arrived, and the question of adjournment was raised, Mr. Paulding repeated his demand for the evidence, if any, of violation of section 10. Commissioner McChord then announced that complainant would be expected to go directly to the point in the morning and take up the other matters later.

At the opening on December 5 Mr. Colahan said he would prefer to proceed with his case in an orderly way but that he would excuse Mr. Sprague and call Mr. Matson and representatives of the New York Central as to section 10. Mr. Paulding insisted that Mr. Sprague, as the one who signed the complaint, tell what he knew, and charged him with being afraid to do so, but Commissioner McChord ruled that other witnesses might be called provided they would "stick to section 10." Mr. Matson was questioned regarding his law firm, which he said had represented the signal company for several years. He said that since he had been a member Mr. Harris had not been connected with it and had never had anything to do with the business of the present firm; but that the firm had originally been Harris & Harris, including Mr. A. H. Harris and his late father; and that A. H. Harris had permitted his name to be retained; and that his brother is now a member. After more argument between counsel Mr. Matson said Mr. Balliet was a stockholder of record from April 13, 1925, to September 19, 1925, when the stock was sold, and that there had been a substantial rise in stock during that time. Mr. Sprague then resumed the stand and Mr. Paulding asked whether it was claimed that any other persons connected with the New York Central were connected with the signal company. Mr. Colahan replied that he had other persons in mind but that he had not yet satisfied himself whether they would come under section 10. Mr. Sprague criticized the tests made by the New York Central of the G. R. S. control as inadequate and said that he had submitted a bid covering five divisions with certain exceptions as to conditions and had later made a contract for equipment for the Mohawk division, but that the New York Central had not then specified a forestalling feature. Commissioner Esch interrupted to point out that the commission had not included the forestalling feature in its specifications until July, 1924. Mr. Sprague also said that in their discussions with

him members of the New York Central Lines committee had always insisted that a continuous type of train control was essential and had asked him if he would undertake to develop a continuous device instead of the intermittent type.

A. H. Harris, vice-president of the New York Central, had taken the stand on December 3 to testify that although he was formerly a director and a stockholder of the General Railway Signal Company he had resigned as a director in 1906 and sold his stock in 1911. He also said he had withdrawn from the law firm that was brought into the testimony later.

C. H. Weaver, air brake supervisor of the New York Central, testified that the air brake application with the G. R. S. train control device is safe and H. Courtney, mechanical engineer of the Pittsburgh & Lake Erie, described some tests, made on that road, of the operation of air brakes on various trains and at varying speeds with the Union Switch & Signal Company's auto-manual inductive train control system. He said that with service applications of the brakes no shocks worth speaking of occurred and with emergency applications no damage.

W. H. Elliott, signal engineer of the New York Central, denied certain statements made in the bill of particulars. Regarding the possibility of crossed wires, etc., he said that the company had ordered cables of especially heavy insulation and protection against mechanical wear, of which a sample was shown to the commissioners. As to the objections made to the forestalling feature he said that while the engineman could operate it improperly if he wanted to, unless he was properly alert and in control of his train the brakes would be applied when he passed a signal set against him, because he must pull out the lever while passing the track element and then release it inside of 15 seconds; otherwise the air will be applied. No result would occur if he pulled the lever elsewhere than when passing an inductor. He also said that there is no reason why the train control apparatus cannot be tested daily, as signal apparatus is, and that a simple method of inspection will be adopted. He said that whereas he had formerly taken the position that a braking distance of 8,400 ft. should be allowed, that was on the assumption of a 15-lb. air reduction; and that since experience with the device in actual operation has shown that it is practicable to employ an air reduction in excess of that required for a full service application, up to 26 lb., a braking distance of 4,200 ft. is sufficient.

On cross-examination Mr. Colahan asked if the witness thought a device safe that permits the engineman to substitute his own volition for the operation of the device and to forestall whenever he elects to pass a signal, at high speed and with short intervals between trains. Mr. Elliott replied that he did, with the restrictions imposed; and that although a stop device may not provide as complete safety as speed control he thought it more desirable under the actual conditions that have to be met in railway operation. Speed control could be added to the General Railway Signal Company's device, he said. The device lends itself to simple and not too costly development in other ways, but he thought that at the present stage speed control would not be desirable because of the limitations of the air-brake system. It is not practicable, on heavy trains to release the brakes soon enough, after their speed has been reduced, and trains would be stopped too often. Asked whether he would say that an intermittent train control is "safe" Mr. Elliott said that "safe" is a broad word; that he would not call any train control entirely safe in the present state of the art; and that an installation, to the extent which is being required by the commission, involves a degree of hazard. In reply to a question he said that the device without speed control is cheaper than it would be with it, and that the cost had been considered as one element.

J. C. Mock, signal and electrical engineer of the Michigan Central, said it was desirable to avoid automatic brake applications as much as possible, and when asked whether he approved of the idea of allowing an engineman to forestall at any speed said that the purpose was to enable him to control his train and that if alert he should be able to forestall when he considered it advisable. It was not expected that he would do so without reason and without first reducing speed if traveling at a high rate. He said that he would not concede that engineers are going to forestall wilfully in order to pass signals for the purpose of making up time. He said it would be "physically possible but not mentally possible." F. B. Wiegand, signal engineer of the New York Central Lines west of Buffalo, said he concurred in the statements made by preceding witnesses but would like to lay more stress on the indicating feature of the track element. The engineer, he said, ordinarily runs under more proceed signals than stop or caution signals and, in case of a short circuit, if he holds the lever more than 15 seconds waiting for the whistle his train will be stopped. Mr. Wiegand expressed the belief that continuous control can eventually be applied to the G. R. S. device without radical change in the engine apparatus.

Charles S. Bushnell, of the engineering department of the General Railway Signal Company, said that any mistaking of a signal will result in a stop. He was questioned by Commissioner McChord as to what would have happened with automatic train control in the case of the recent accident on the Pennsylvania at Monmouth Junction, N. J., when an engineman ran by three signals in a fog. Commissioner McManamy asked the witness if that engineman would not have been stopped by any one of the three signals because he would not have been able to forestall in the fog, not knowing the exact location of the signals; and Mr. Bushnell replied in the affirmative.

W. J. Eck, superintendent of the signal and electrical department of the Southern, testified regarding the operation, during the past year, of the General Railway Signal Company's device on his road, which he said was the same as that to be installed on the New York Central. When Mr. Colahan raised a question about the specifications for the New York Central installation Mr. Paulding said that no new specifications were made for this contract; but that the commission's specifications were the ones that govern. Mr. Eck said that no damage to freight trains had occurred as the result of automatic brake applications caused by the train control apparatus, and that he could not conceive of an engineer in possession of his faculties operating the forestalling device when he should not do so, or without keeping his train under control. D. B. Fleming, general superintendent of the first district of the New York Central, the final witness on behalf of the road, testified regarding the spacing of trains on the New York Central and the operating aspects of train control; also the desirability of not taking control of the train away from the engineman, although he admitted that accidents are sometimes caused because the engineer does not function properly. He said that he had thought that the time may come "after we get the knots out of train control" when railroad men would not want to do without it. Mr. Sprague asked what kind of "nuts" he referred to but the witness said he had misunderstood the word used. The hearing attracted so many railway, signal, and train control men that the commission's second largest hearing room could not accommodate them, and after the first morning session the hearing was moved across the hall to the main hearing room.

Woodin Elected President of American Locomotive Company

New president largest individual stockholder and for many years director and member of executive committee

WILLIAM H. WOODIN, president of the American Car & Foundry Company, has been elected also president of the American Locomotive Company, succeeding Andrew Fletcher, deceased. Mr. Woodin has been a director and member of the executive committee of the American Locomotive Company for many years. He is one of the largest individual stockholders of the company, in addition to which the American Car & Foundry Company has also large holdings in American Locomotive Company stock.

W. H. Woodin

It is something new in the railway supply field to have two such leading companies under a single executive leadership. It is not understood, however, that there is at present any intention of bringing the two companies into a closer relationship than exists today. The election of Mr. Woodin follows rather because of recognition of his executive ability supplemented by his extended familiarity with the railway supply field in general and with the operations of the American Locomotive Company in particular. As a matter of fact, the election of Mr. Woodin happens to follow precedent established in the case of his immediate predecessor. Andrew Fletcher, when he was elected president of the American Locomotive Company, was also president of W. & A. Fletcher & Co., ship and engine builders and ship repairers of Hoboken, New Jersey, and with his new position continued also his former affiliation. Furthermore, as in the case of Mr. Woodin, he had been thoroughly familiar with the American Locomotive Company's operations due to his having been for some time prior to his becoming head of the company, a director and member of the executive committee.

The name of Woodin has been associated with railway car building practically since the inception of that industry in this country. In 1842, the grandfather of the present head of the largest company in the industry was one of the organizers of the Jackson & Woodin Manufacturing Company, Berwick, Pa., which was one of the companies taken over by the American Car & Foundry Company, at the time of its organization in 1899.

The American Car & Foundry Company today has outstanding 30 million dollars preferred stock on which it pays 7 per cent dividends, and 600,000 shares of common stock without par value issued last March on the basis of two shares for one of the old stock, and which new stock now pays 6 per cent dividends. As of April 30, 1925, the company reported net working capital of 37 million dollars, and the value of its property and plant as 73 million dollars. It operates 4 passenger car building plants, 16 freight car building plants, 6 wheel foundries, 8 grey iron foundries, one malleable iron foundry, one brass foundry, two rolling mills and forges, and has also an architectural woodwork mill and a plant for building and repairing car floats and light capacity vessels. Its annual capacity is 125,000 freight cars, 1,850 passenger cars, 1,500,000 chilled cast iron wheels, 105,000 tons of grey iron castings, 230,000 tons merchant bar iron, and 30,300 tons of forgings for steel, in addition to the forgings used by the company in building cars.

The American Locomotive Company has outstanding 25 million dollars of 7 per cent cumulative preferred stock and 500,000 shares of no par value common stock on which at present it is paying $8 annually but on which in 1925 it has also paid an extra dividend of $10 a share. The company's investment in property is about 35 million dollars in addition to which, at the present time, the company has large holdings of United States Treasury certificates or similar securities. The company at the present time is operating eight plants, including the plant at Montreal. These details will give an indication of the amount of executive responsibility that Mr. Woodin takes up in assuming his new office as president of the American Locomotive Company.

During 1925, neither the American Locomotive Company nor the American Car & Foundry Company has been favored with large orders. Recently, however, there has been a marked revival in the purchases of railway equipment. It is Mr. Woodin's view that this revival is to be of long standing and not merely a temporary spurt. He has expressed the view that one of the reasons for the lack of greater volume of buying during the present year has been the marked improvement in equipment

utilization. This improved use of cars or locomotives, he maintains, however, can have but a temporary effect on equipment purchasing. The railways, in other words, will have to resume their purchases of equipment once the new conditions resulting from increased utilization have been caught up with through the excess of retirements over installations. The present volume of orders apparently bears out Mr. Woodin's contention.

William Hartman Woodin was born at Berwick, Pa., May 27, 1868. He received a technical education at Columbia University, School of Mines, which he attended in the class of 1890. He served in the shops of the Jackson & Woodin Manufacturing Company at Berwick, and in 1892 was made general superintendent of that plant. In 1895 he was elected vice-president and in 1899 president. When the company was taken over by the American Car & Foundry Company in 1899 he was appointed district manager of the Berwick plant. He later became assistant to the first vice-president of the new company, then in 1902 he was made a director and assistant to the president, having general direction of the company's affairs under President Frederick H. Eaton, and on February 1, 1916, he succeeded to the presidency. As noted above, he has also been a director and member of the executive committee of the American Locomotive Company. He is chairman of the board of the Canadian Car & Foundry Company and a director of the American Exchange Securities Corporation, the American Beet Sugar Company, the Westinghouse Electric & Manufacturing Company, the Montreal Locomotive Works, the Westinghouse Electric International Company, the General Motors Corporation, the Cuba Company, the Cuba Railroad Company, the Compañia Cubana and the American Ship & Commerce Corporation.

Mr. Woodin has a considerable reputation as a coin collector. He is a member of the American Numismatic Association and of the New York Numismatic Club, and is the author with Edgar H. Adams of one of the standard books on American coins.

Mr. Woodin's position as an industrial executive has given him sufficient standing in the public eye so that he was selected to serve as fuel administrator for the state of New York during the war.

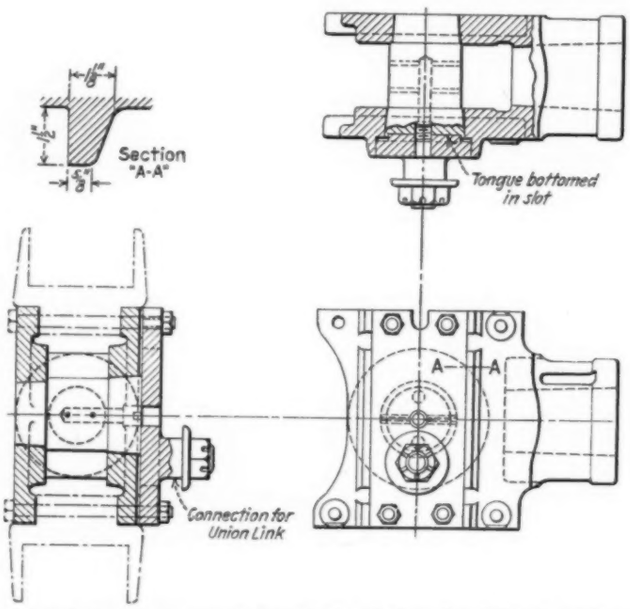
Hubbard Crosshead Developed on Rock Island

THE Hubbard crosshead illustrated and described in this article originated on the Chicago, Rock Island & Pacific and has been used successfully for about two years on that road, being specified on the last few lots of new locomotives and applied in case of renewals. Perhaps the two most prominent features of the new crosshead are first, the arrangement for applying and removing the wrist pin from the outside, and second, the provision of lugs cast on the face of the crosshead to relieve the crosshead bolts of practically all shear.

The wrist pin of the crosshead is applied or removed from the outside and cannot turn in the crosshead fit as a slot across the outside end is engaged by a tongue on the keeper plate. The keeper plate cannot turn as it is secured by two top and two bottom gib bolts, and the shear is taken off these bolts by lugs cast on the outside wing or cheek of the crosshead. Washers between the keeper and plate of the crosshead body give a metal to metal bearing throughout the entire length of the gib bolts.

This design saves time in enginehouses as it is not necessary to spot the engine to remove the wrist pin. Heavy modern locomotives are difficult to spot by pinching and in some cases it is impossible to get enough bars to the wheels to move them. To wait for the hostler to bring around a hot engine means many valuable minutes lost to the mechanic, and adds to the time required to turn the engine. Not only is this crosshead designed to reduce enginehouse turning time and facilitate making running repairs, but in case of a breakdown on the road where it is necessary to take down the main rods, this can be done at once by the engine crew, again without waiting for help to spot the engine.

The design of the Hubbard crosshead is such that the wrist pin cannot work in as is often the case where nuts have worked off the ordinary style of wrist pin or when the end of the pin breaks with the nut and cotter key intact. The wrist pins for the new crosshead are fitted with draw, and have the tongue on the keeper plate bottom in the slot in the end of the wrist pin. The washers at the gib bolts in the end of the keeper plate are then



General Arrangement of the Hubbard Crosshead Used on the Chicago, Rock Island & Pacific

made the necessary thickness to give a slight spring to the plate, thus keeping a substantial pressure on the wrist pin.

The union link trunnion is shown slightly below the wrist pin center, this arrangement permitting center lubrication of the wrist pin. The trunnion may be central over the pin, or the keeper plate may be of cast steel and extended down and out to meet any present location of the union link.

This crosshead, which is made by the Hubbard Steel Foundry Company, Chicago, can be altered in design to take care of any design of crosshead including the Laird type. Ordinarily the alligator type crosshead can be changed by simply adding the lugs which hold the keeper plate to the present pattern. Both right and left crossheads can then be machined on the same pattern. It is customary for the railroad to make the wrist pin and keeper plate but the manufacturer furnishes them to the railroad's blue prints if required. The crosshead fits are maintained practically standard for the life of the crosshead, it not being necessary to build up these fits and rebore them. This eliminates the necessity of welding which may set up stresses, sufficient to develop checks and cause subsequent crosshead failures.

General News Department

The Railway Business Women's Association was organized by 50 women employed in railway offices in Chicago on December 4.

Daylight saving, as a general policy has been rejected by the state of Maine, the voters of the state, in a referendum, having decided against the plan by a large majority.

C. E. Brooks, chief of motive power of the Canadian National, will present a paper on rail motor cars at the next meeting of the Railway Club of Pittsburgh, to be held on December 17.

The Central of New Jersey has been authorized by the Interstate Commerce Commission to install automatic train control between Elizabethport, N. J., and Bay Head Junction, N. J., in lieu of the section named January 14, 1924, in the second train control order.

A number of mining companies in the state of Chihuahua, Mexico, have proposed to the Mexican government that they be permitted to subscribe to a loan of twenty-five million pesos, or approximately $12,000,000, this amount to be used in the construction of a railroad from the terminus of the Kansas City, Mexico & Orient at Sanchez, Chihuahua, west about 150 miles, to a connection with the Southern Pacific of Mexico in the state of Sonora.

Pacific Club to Discuss Statistics

The Pacific Railway Club at its next meeting, to be held on December 17, will discuss the value of statistics. Preparations for the papers to be read are in the hands of the committee on statistics of the Southern Pacific. The club held a meeting on "The Younger Man in Railroading" on December 5. It will continue to alternate its meetings monthly between San Francisco and Oakland and, in addition, will hold three or four meetings a year in Sacramento.

New York Railroad Club Dinner

A rather unusual type of program has been prepared for the annual dinner of the New York Railroad Club, which will be held at the Hotel Commodore, New York, on Thursday evening, December 17. Dr. Charles Alexander Richmond, president of Union College, and noted for his ability as a speaker, will give a short talk on fellowship, in which he will emphasize the importance of co-operation and goodwill between the managements of the railways and the allied manufacturing interests and their great army of employees. Important executives of the railway and railway supply industries will be featured in moving pictures and otherwise. The indications are that the attendance will exceed that of last year, when 3,000 guests were present.

Railroad Division, A.S.M.E., Elects New Officers

The following have been elected members of the Executive Committee of the Railroad Division of the American Society of Mechanical Engineers for 1926: Henry B. Oatley, vice-president, Superheater Company, New York (chairman); A. F. Stuebing, chief engineer, Bradford Corporation, New York; R. S. McConnell, Baldwin Locomotive Works, Philadelphia, Pa.; Wm. Elmer, superintendent Middle division, Pennsylvania, Altoona, Pa.; C. E. Chambers, superintendent of motive power and equipment, Central of New Jersey, Jersey City, N. J; A. E. Ostrander, American Car & Foundry Company, New York; Eliot Sumner, superintendent of motive power, Pennsylvania, New York. Marion B. Richardson, associate editor, *Railway Age,* New York, is secretary.

At the present time 413 members of the A. S. M. E. are enrolled in the Railroad division. This number, however, does not include all of the members of the society who are interested in railroad work. In order to make the list as complete as possible, and also to extend the service of the Railroad division to all members engaged in railroad work and allied industries, it is requested that those who have not already had their names enrolled as members of the Railroad division do so at once.

Chicago Roads Agree on River Straightening

Acceptance under certain conditions by the Baltimore & Ohio of the plan of the Chicago citizens' committee for the financing by five railroads of the straightening of the Chicago river between Polk and 18th streets in Chicago, has removed the last opposition to the plan by the road most involved. The basic principles of the citizens' committee plan were approved by President Willard of the Baltimore & Ohio in spite of the fact that the proposed river channel will cut through the present yards and right-of-way of the B. & O. so that its construction would interfere with the operations of the road for a considerable time.

Under the committee's plan the railways will contribute over $7,000,000 of the $8,500,000 cost of the river straightening, this contribution to be made in return for the increase in their land holdings resulting from the improvement. Of this $7,000,000, the Baltimore & Ohio will contribute over $3,000,000.

Railway Net for 10 Months 4.83 Per Cent

Class I railroads having a total mileage of 236,628 miles, earned on their property investment during the first ten months this year at the annual rate of return of 4.83 per cent, according to reports compiled by the Bureau of Railway Economics. The net operating income for the ten months' period amounted to $935,047,505, as compared with $806,665,604 for the same period last year. The increase was due not only to the fact that freight traffic was approximately 5.7 per cent greater but also to increased efficiency and economy in operation in large part the result of the large capital expenditures that have been made since 1922. Operating revenues for the first ten months this year amounted to $5,129,774,464 compared with $4,976,508,497 during the corresponding period in 1924. Operating expenses totaled $3,809,091,395, as compared with $3,803,794,317 during the first ten months of 1924.

The net operating income of the Class I railroads for October amounted to $137,699,986, which is at the annual rate of return of 5.23 per cent on property investment, and the largest, in dollars, ever recorded for a month. Operating revenues in October totaled $591,313,021, as compared with $572,870,675 for the same month last year. Operating expenses totaled $410,351,842, as compared with $404,037,942 during the same month last year. Expenditures for maintenance of equipment in October amounted to $110,427,491, a decrease of nearly $2,850,000 below October, 1924. Fewer freight cars and locomotives were in need of repair in October than at any time since about January, 1924.

Nineteen Class I roads operated at a deficit during the month, of which eleven were in the Eastern district, one in the Southern and seven in the Western district.

Class I railroads in the Eastern district for the first ten months this year had a net railway operating income of $467,402,048, which was at the annual rate of return of 5.21 per cent on their property investment. The net railway operating income in October amounted to $56,438,955, compared with $51,847,687 during the same month last year.

In the Southern district, Class I railroads during the first ten months of 1925 had a net railway operating income of $137,123,944, which was at the annual rate of return of 6.06 per cent. For October their net operating income amounted to $17,732,080. In October, last year, it was $13,798,927.

For the Class I railroads in the Western district for the ten months period, the net operating income was $330,521,513, which was at the annual rate of return of 4.07 per cent on property investment. The same roads in October had a net railway operating income of $63,528,950 as compared with $61,573,385 for the same month last year.

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF OCTOBER AND TEN MONTHS OF CALENDAR YEAR 1925

Name of road		Average mileage operated during period.	Operating revenues: Freight.	Passenger.	Total (inc. misc.)	Operating expenses: Maintenance of Way and structures.	Maintenance of Equipment.	Traffic.	Transportation.	General.	Total.	Operating ratio.	Net from railway operation.	Operating income (or less).	Net after rents.	Net after rents, 1924.
Akron, Canton & Youngstown	Oct.	171	$294,489	$301	$307,838	$53,562	$25,107	$13,271	$84,448	$14,278	$190,666	61.9	$117,172	$100,195	$54,692	$77,823
	10 mos.	171	2,539,437	4,638	2,660,038	385,317	251,973	111,662	712,749	120,489	1,575,995	59.2	1,084,043	939,457	574,737	550,824
Alabama & Vicksburg	Oct.	141	266,141	60,570	354,820	42,350	46,982	10,824	105,760	14,711	222,624	62.7	132,196	92,149	95,328	56,307
	10 mos.	141	2,189,436	568,605	2,986,899	428,611	472,795	102,125	953,352	142,677	2,106,041	70.5	880,858	578,325	638,014	417,560
Vicksburg, Shreveport & Pacific	Oct.	188	381,362	64,908	478,860	69,375	69,050	11,854	151,629	15,217	319,917	66.8	158,943	123,753	96,434	37,710
	10 mos.	188	2,862,807	637,354	3,735,076	602,826	596,900	120,356	1,335,362	155,969	2,832,705	75.8	902,371	636,722	517,526	391,591
Ann Arbor	Oct.	293	530,813	21,959	573,981	68,119	114,028	10,469	202,997	18,263	413,875	72.1	160,106	139,188	132,320	93,134
	10 mos.	293	4,402,039	266,044	4,854,504	518,913	954,993	104,696	1,886,852	165,153	3,630,656	74.8	1,223,848	1,025,850	904,097	501,348
Atchison, Topeka & Santa Fe	Oct.	9,186	16,785,145	2,925,609	21,141,579	1,988,821	3,463,908	335,541	5,455,978	374,161	11,556,939	54.7	9,584,640	7,616,521	7,704,618	5,851,252
	10 mos.	9,185	115,208,146	33,241,104	161,166,963	23,304,590	32,844,746	3,347,630	50,090,796	3,808,943	113,056,589	70.1	48,110,374	35,259,725	34,992,644	29,766,002
Gulf, Colorado & Santa Fe	Oct.	1,908	2,414,662	291,523	2,829,165	351,045	396,881	50,163	806,828	64,127	1,659,442	58.7	1,169,723	1,078,371	1,025,537	1,419,858
	10 mos	1,908	19,646,871	2,745,385	23,638,666	4,749,139	4,787,419	492,858	7,405,405	658,341	18,077,161	76.5	5,561,505	4,670,725	3,473,837	3,656,266
Panhandle & Santa Fe	Oct.	858	1,109,272	139,141	1,317,309	94,696	237,762	8,600	367,515	18,058	720,884	54.7	596,425	517,593	453,394	423,692
	10 mos.	858	7,217,214	1,161,548	8,897,753	1,371,988	1,823,857	85,106	2,570,930	188,737	6,013,762	67.6	2,883,991	2,482,925	1,928,991	1,704,226
Atlanta & West Point	Oct.	93	188,426	74,078	300,747	32,975	45,171	10,940	112,507	11,264	218,346	72.6	82,401	67,455	52,357	43,869
	10 mos.	93	1,582,034	716,228	2,623,386	309,149	446,707	104,088	976,550	107,095	1,988,646	75.8	634,740	477,458	367,713	264,691
Western of Alabama	Oct.	133	230,263	72,264	331,954	23,233	45,365	11,964	89,820	12,019	187,257	56.4	144,697	120,125	110,795	62,923
	10 mos.	133	1,903,795	657,261	2,813,120	328,958	506,626	111,883	813,111	107,642	1,913,505	68.0	899,615	726,772	688,980	516,818
Atlanta, Birmingham & Atlantic	Oct.	639	403,834	47,246	484,973	89,348	100,258	25,690	177,255	16,901	409,521	86.4	75,452	63,648	37,955	15,931
	10 mos.	639	3,663,015	438,743	4,421,009	857,075	972,056	240,856	1,701,549	166,250	3,938,382	89.1	482,627	351,688	101,185	83,722
Atlantic Coast Line	Oct.	4,900	5,812,732	1,927,729	8,504,905	949,036	1,645,841	134,857	2,971,441	160,196	5,926,168	69.7	2,578,737	1,978,020	1,907,594	528,596
	10 mos.	4,887	53,069,852	17,474,391	76,370,332	8,967,924	14,533,252	1,404,633	25,739,566	1,543,421	52,695,645	69.0	23,674,687	18,361,834	16,995,064	12,079,875
Charleston & Western Carolina	Oct.	342	307,534	24,435	347,924	49,223	48,769	6,559	132,701	5,838	242,910	69.8	105,014	84,913	81,251	80,802
	10 mos.	342	2,989,804	261,032	3,402,138	566,424	439,913	72,758	1,316,323	65,792	2,460,932	72.3	941,206	740,347	621,625	399,106
Baltimore & Ohio	Oct.	5,292	19,659,398	2,497,585	23,736,093	3,000,330	4,985,695	413,021	7,751,192	519,718	16,858,734	71.0	6,877,359	6,027,348	5,416,924	4,533,474
	10 mos.	5,292	159,842,525	23,447,179	196,486,614	23,910,783	44,636,841	3,802,464	69,478,524	5,164,517	148,719,224	75.7	47,767,390	39,311,990	35,076,446	32,261,491
Baltimore & Ohio Chicago Term	Oct.	80	.....	.....	237,733	33,794	41,707	1,855	151,356	10,857	244,993	72.5	92,740	49,912	147,782	83,951
	10 mos.	80	.....	.....	3,025,135	352,572	362,270	18,721	1,610,155	109,386	2,502,695	82.7	522,440	106,370	1,047,848	252,288
Staten Island Rapid Transit	Oct.	23	108,436	105,374	244,996	68,660	23,260	1,837	118,938	14,695	227,390	92.8	17,606	2,296	—31,193	—33,562
	10 mos.	23	989,515	1,206,582	2,503,906	540,929	294,574	20,514	1,230,751	145,952	2,232,720	89.2	271,186	113,079	—113,311	—233,147
Bangor & Aroostook	Oct.	616	603,641	51,931	679,717	108,490	117,381	4,794	162,331	23,000	417,917	61.5	261,800	199,980	223,562	215,000
	10 mos.	616	5,007,912	542,628	5,800,377	1,070,113	1,165,394	47,709	1,572,209	225,408	4,098,541	70.7	1,701,836	1,221,698	1,501,630	1,378,385
Belt Ry. Co. of Chicago	Oct.	32	.....	.....	638,778	66,809	67,584	3,180	281,185	9,076	427,834	67.0	210,944	163,557	161,931	171,475
	10 mos.	32	.....	.....	5,836,786	572,664	593,887	32,359	2,565,871	100,234	3,865,015	66.2	1,971,771	1,529,344	1,421,537	1,467,900
Bessemer & Lake Erie	Oct.	228	1,502,159	14,442	1,537,898	102,119	340,896	16,640	358,952	27,346	852,181	55.4	685,717	583,590	669,244	453,238
	10 mos.	228	13,168,943	188,450	13,585,027	961,793	3,561,593	147,724	3,455,339	306,677	8,426,797	62.0	5,158,230	4,449,559	4,815,216	2,677,037
Bingham & Garfield	Oct.	33	46,754	.....	48,286	7,618	13,210	1,387	11,722	4,517	38,685	80.1	9,601	—1,666	12,122	11,421
	10 mos.	33	502,310	587	515,146	93,172	96,457	14,131	128,600	48,018	382,218	74.2	132,928	25,079	152,603	118,310
Boston & Maine	Oct.	2,228	4,594,983	1,611,333	7,116,332	832,587	1,306,849	76,796	2,807,450	246,586	5,294,106	74.4	1,822,226	1,556,640	1,267,197	996,654
	10 mos.	2,249	41,538,933	16,681,322	66,327,554	8,450,715	13,265,485	668,559	26,828,951	2,377,730	51,821,110	78.1	14,506,444	11,911,405	9,514,407	7,143,274
Brooklyn Eastern District Term	Oct.	9	127,161	.....	133,975	8,723	14,382	185	46,827	5,600	75,717	56.5	58,258	50,587	50,587	38,233
	10 mos.	9	1,141,710	.....	1,207,783	80,792	143,000	2,295	429,276	56,453	711,816	58.9	495,967	420,043	427,972	394,335
Buffalo & Susquehanna R. R. Corp.	Oct.	253	99,738	2,747	107,751	31,551	45,623	1,817	35,758	8,135	122,874	114.0	—15,123	—18,523	—6,571	31,411
	10 mos.	253	1,218,109	38,821	1,297,071	315,192	491,562	18,680	411,229	90,771	1,327,424	102.3	—30,353	—64,376	109,537	148,085
Buffalo, Rochester & Pittsburgh	Oct.	601	1,430,448	104,210	1,602,801	248,976	400,802	27,218	550,076	41,845	1,270,000	79.2	332,801	282,726	307,062	259,369
	10 mos.	594	11,608,828	1,210,781	13,500,259	1,760,338	3,746,732	269,524	5,102,562	409,264	11,309,568	83.8	2,190,691	1,810,327	1,965,863	2,046,171
Canadian Pacific Lines in Maine	Oct.	233	89,166	24,858	126,734	35,745	25,669	5,899	68,373	2,182	137,868	108.8	—11,134	—22,134	—25,488	138
	10 mos.	233	1,395,992	300,551	1,938,910	620,960	416,966	49,672	851,306	38,677	1,977,581	107.5	—138,671	—248,671	—353,052	—214,301
Central of Georgia	Oct.	1,920	2,067,713	545,568	2,888,666	397,124	444,627	77,771	974,294	94,192	1,978,494	68.5	910,172	782,552	707,552	542,198
	10 mos.	1,920	17,821,417	4,939,248	24,929,488	3,906,571	4,339,611	720,843	9,027,244	923,986	18,866,910	75.7	6,062,578	4,930,834	4,425,962	3,727,010
Central of New Jersey	Oct.	690	3,247,901	754,965	4,359,779	622,517	965,535	44,576	1,714,358	110,447	3,478,761	79.8	881,018	531,217	420,525	1,565,122
	10 mos.	691	35,898,475	8,298,826	47,337,872	5,316,617	10,075,715	402,427	17,601,414	1,078,994	34,682,582	73.3	12,655,290	8,923,263	7,700,599	8,112,947
Central Vermont	Oct.	434	592,886	100,000	763,652	108,955	84,696	16,173	333,204	21,980	566,063	74.1	197,589	178,498	159,143	77,420
	10 mos.	434	5,309,089	1,120,944	7,121,676	1,601,810	1,173,091	148,671	3,193,620	228,084	6,353,823	89.2	767,853	576,357	399,844	517,292
Chesapeake & Ohio	Oct.	2,627	10,532,426	768,669	11,781,795	2,166,496	2,643,885	110,942	3,144,274	227,511	8,325,746	70.7	3,456,049	2,708,774	2,987,333	2,033,127
	10 mos.	2,610	88,875,522	8,098,258	101,368,320	15,958,215	25,791,650	1,071,215	28,476,623	2,213,332	73,800,541	72.8	27,567,779	22,640,124	24,964,964	18,817,967
Chicago & Alton	Oct.	1,055	2,184,388	540,857	2,990,994	361,281	640,622	77,039	1,006,598	58,758	2,134,097	71.4	856,807	721,189	570,986	465,405
	10 mos.	1,055	18,021,875	5,272,732	25,613,648	3,179,650	5,703,896	656,976	9,238,443	559,755	19,357,765	75.6	6,255,883	5,223,159	3,703,085	3,842,423
Chicago & Eastern Illinois	Oct.	945	1,911,647	373,367	2,488,393	232,223	657,546	78,014	864,607	66,573	1,912,306	76.8	576,087	439,877	417,169	335,568
	10 mos.	945	16,117,851	3,750,468	21,577,268	2,181,744	6,378,017	611,997	8,093,713	680,729	18,094,861	83.9	3,482,407	2,348,838	1,471,980	1,159,308
Chicago & North Western	Oct.	8,461	11,177,873	2,122,101	14,772,076	2,450,525	2,799,375	201,268	5,176,876	349,317	11,043,783	74.8	3,728,293	2,924,906	2,722,768	2,773,126
	10 mos.	8,461	88,036,841	22,468,757	124,072,234	17,566,474	25,355,080	1,819,211	47,353,094	3,424,461	96,195,579	77.5	27,876,655	19,846,330	18,353,938	14,472,154
Chicago, Burlington & Quincy	Oct.	9,399	12,264,556	2,161,530	15,751,770	2,698,411	2,715,816	254,659	4,986,974	363,519	10,503,971	66.7	5,247,799	4,195,376	3,893,056	3,993,400
	10 mos.	9,397	97,851,504	21,089,496	131,685,382	16,479,651	27,764,059	2,509,076	45,404,933	3,645,473	96,617,831	73.4	35,067,551	26,045,725	23,324,416	24,311,015
Chicago Great Western	Oct.	1,496	1,958,633	307,456	2,456,654	324,036	428,014	81,828	899,657	58,088	1,808,107	73.6	648,547	565,147	406,011	394,053
	10 mos.	1,496	15,607,409	3,024,299	20,303,677	2,966,073	4,104,693	735,037	8,071,541	550,012	16,559,428	81.6	3,744,249	2,931,607	1,648,352	1,772,234
Chicago, Indianapolis & Louisville	Oct.	649	1,279,482	237,255	1,678,588	182,174	360,366	35,031	545,105	34,727	1,171,415	69.8	507,173	418,207	331,802	269,463
	10 mos.	649	10,891,806	2,373,991	14,691,900	1,540,329	3,065,505	349,795	5,148,668	336,783	10,586,516	72.1	4,105,384	3,350,584	2,252,530	1,851,347

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF OCTOBER AND TEN MONTHS OF CALENDAR YEAR 1925—CONTINUED

Name of road		Average mileage operated during period.	Operating revenues: Freight.	Passenger.	Total (inc. misc.)	Operating expenses: Maintenance of—Way and structures.	Maintenance of—Equipment.	Traffic.	Transportation.	General.	Total.	Operating ratio.	Net from railway operation.	Operating income (or less).	Net after rents.	Net after rents, 1924.
Chicago, Milwaukee & St. Paul	Oct.	11,204	$13,179,712	$1,586,233	$16,240,927	$2,010,201	$3,443,805	$229,572	$5,504,593	$346,971	$11,594,232	71.4	$4,646,695	$3,942,652	$3,367,968	$3,921,287
	10 mos.	11,204	104,429,644	16,749,422	134,632,455	19,336,893	33,047,468	2,217,188	50,711,615	3,443,205	109,358,712	81.2	25,273,743	17,776,407	12,999,478	14,245,503
Chicago, Peoria & St. Louis	Oct.	215	72,640	6,956	86,006	15,222	19,328	722	45,293	8,431	88,996	103.5	—2,990	—5,740	—27,447	—6,672
	10 mos.	224	736,014	81,056	885,848	158,116	160,956	12,313	433,396	81,228	846,009	95.5	39,839	10,281	—162,417	—189,189
Chicago River & Indiana	Oct.	19	.....	.....	630,962	87,911	75,069	901	229,820	13,009	406,710	64.5	224,252	173,775	302,502	329,468
	10 mos.	19	.....	.....	5,695,467	777,505	842,127	8,159	2,218,475	128,405	3,974,671	69.8	1,720,796	1,307,765	2,407,556	2,628,232
Chicago, Rock Island & Pacific	Oct.	7,561	8,805,440	1,974,474	11,699,444	1,385,759	2,414,649	241,992	3,995,112	301,486	8,352,635	71.4	3,346,809	2,760,799	2,477,855	2,557,717
	10 mos.	7,570	75,904,068	19,582,177	103,263,447	12,308,243	23,310,922	2,270,951	39,320,533	2,949,462	80,582,280	78.0	22,681,167	17,163,738	13,096,297	12,445,546
Chicago, Rock Island & Gulf	Oct.	458	426,052	75,482	545,558	43,743	78,484	17,456	220,885	16,128	379,303	69.5	166,255	132,834	126,534	244,823
	10 mos.	460	3,887,125	746,073	5,076,899	616,898	695,635	173,642	2,059,464	162,151	3,745,882	73.8	1,331,017	1,101,770	886,567	1,047,646
Chicago, St. Paul, Minn. & Omaha	Oct.	1,749	1,995,094	398,675	2,578,985	399,702	412,171	31,059	1,035,928	80,903	1,959,056	76.0	619,929	457,973	416,045	624,083
	10 mos.	1,749	16,335,097	4,471,730	22,488,632	3,077,608	4,203,082	304,570	9,495,315	758,196	17,930,211	79.7	4,558,421	3,223,246	2,675,335	2,739,485
Cincinnati, Indianapolis & Western	Oct.	347	364,300	28,253	424,392	59,947	84,076	15,694	163,235	16,950	340,843	80.3	83,549	62,700	41,911	58,409
	10 mos.	347	3,411,218	303,489	3,995,687	546,501	812,846	157,809	1,615,906	175,698	3,318,647	83.1	677,040	491,158	216,359	202,410
Clinchfield R. R.	Oct.	309	744,991	26,279	784,901	109,381	183,287	22,409	148,643	20,629	483,407	61.6	301,494	231,475	357,858	289,215
	10 mos.	309	6,809,747	303,361	7,256,921	884,247	1,795,867	237,793	1,455,346	206,185	4,565,653	62.9	2,691,268	2,110,927	2,837,406	2,202,607
Colorado & Southern	Oct.	1,056	1,045,643	119,795	1,258,526	154,944	221,553	12,844	407,773	43,016	846,677	67.3	411,849	346,624	313,687	324,496
	10 mos.	1,056	7,780,547	1,379,428	10,020,572	1,431,111	2,228,993	142,137	3,774,302	414,494	8,061,279	80.4	1,959,293	1,316,618	1,171,830	1,335,974
Ft. Worth & Denver City	Oct.	491	848,427	238,844	1,161,146	71,358	168,554	14,972	309,518	37,340	609,816	52.5	551,330	494,141	460,379	473,444
	10 mos.	473	6,647,260	1,824,447	9,082,931	825,031	1,778,008	151,876	2,703,809	356,015	5,882,145	64.8	3,200,786	2,656,087	2,547,051	2,717,835
Wichita Valley	Oct.	271	160,466	28,844	202,898	22,731	8,500	72	49,669	1,662	81,551	40.2	121,347	114,655	83,199	78,636
	10 mos.	271	1,021,133	217,878	1,327,070	207,168	85,980	378	416,026	17,737	714,931	53.9	612,139	523,265	321,285	426,603
Columbus & Greenville	Oct.	167	241,391	27,842	283,244	21,036	19,748	2,876	72,763	9,946	126,212	68.9	57,032	55,508	38,503	5,121
	10 mos.	167	1,058,340	241,491	1,381,824	415,334	169,907	27,309	509,176	99,263	1,218,488	88.2	163,336	145,019	19,730	33,888
Delaware & Hudson	Oct.	881	2,058,400	290,608	2,634,934	329,272	843,269	51,509	1,193,274	145,173	2,597,357	98.6	37,577	—74,885	—76,680	804,280
	10 mos.	884	30,954,078	3,196,294	37,052,813	4,043,327	9,632,695	505,481	13,258,830	1,416,641	29,202,490	78.8	7,850,323	6,724,576	6,911,742	6,440,849
Delaware, Lackawanna & Western	Oct.	992	4,437,360	1,146,017	6,477,320	531,471	1,240,664	126,778	2,665,567	165,658	4,780,180	73.8	1,697,140	1,101,742	1,156,194	1,782,019
	10 mos.	992	51,725,253	11,504,716	71,642,690	7,143,251	14,795,181	1,241,443	27,425,510	1,643,589	52,753,012	73.6	18,889,678	12,938,851	13,359,341	13,244,845
Denver & Rio Grande Western	Oct.	2,577	3,076,900	365,684	3,680,682	596,734	584,206	56,933	1,148,716	88,370	2,516,543	68.4	1,164,139	949,035	922,551	438,856
	10 mos.	2,573	20,913,356	4,265,259	27,425,620	4,905,954	4,776,374	532,471	8,938,451	869,779	20,533,231	74.9	6,892,389	5,132,398	5,447,133	2,653,244
Denver & Salt Lake	Oct.	255	408,186	19,267	448,507	88,944	116,786	1,218	122,082	6,153	335,183	74.7	113,324	104,323	93,280	69,292
	10 mos.	255	2,434,663	252,845	2,958,761	735,993	900,389	16,312	773,890	63,589	2,490,173	84.2	468,588	378,357	383,824	3,623
Detroit & Mackinac	Oct.	375	131,773	15,633	163,015	29,486	35,843	1,969	57,122	5,494	129,676	79.5	33,339	23,185	32,355	66,589
	10 mos.	375	1,098,226	213,918	1,453,167	309,930	372,174	20,621	548,960	55,654	1,304,100	89.7	149,067	47,916	160,875	267,339
Detroit & Toledo Shore Line	Oct.	61	430,555	.....	433,962	21,380	31,850	3,091	102,248	14,928	173,497	39.9	260,465	229,810	135,235	98,284
	10 mos.	61	3,324,285	.....	3,366,378	378,942	340,043	29,197	879,668	88,854	1,716,704	50.9	1,649,674	1,425,109	649,124	254,856
Detroit Terminal	Oct.	26	.....	.....	249,002	22,129	16,101	.....	129,156	3,677	171,063	68.7	77,939	59,955	70,672	47,619
	10 mos.	26	.....	.....	2,116,670	215,175	152,851	84	1,015,016	26,482	1,409,608	66.6	707,062	512,941	651,166	475,017
Detroit, Toledo & Ironton	Oct.	470	1,494,681	6,571	1,513,650	212,195	218,283	8,014	341,697	29,286	809,213	53.5	704,437	629,912	486,332	272,556
	10 mos.	470	11,160,595	70,473	11,369,390	1,770,434	1,848,235	84,197	2,972,719	283,071	6,940,624	61.0	4,428,766	3,948,246	2,916,328	2,294,300
Duluth & Iron Range	Oct.	277	689,982	5,091	792,743	74,395	110,824	1,172	205,533	17,345	409,585	51.7	383,158	320,951	321,248	281,253
	10 mos.	276	5,622,465	64,504	6,404,403	949,967	1,154,377	11,852	1,725,199	192,300	4,039,018	63.0	2,367,385	1,920,617	1,946,010	680,070
Duluth, Missabe & Northern	Oct.	307	1,736,781	6,827	1,983,500	197,350	197,259	2,789	401,797	23,520	823,369	41.5	1,160,131	996,042	990,863	982,848
	10 mos.	306	14,831,054	73,128	16,739,613	1,838,223	1,888,103	32,042	2,957,146	246,009	6,968,209	41.6	9,771,404	8,316,623	8,255,717	4,523,043
Duluth Winnipeg & Pacific	Oct.	178	160,663	13,720	187,130	33,887	63,004	4,465	70,915	7,224	179,524	95.8	7,606	—1,840	377	3,427
	10 mos.	178	1,633,427	145,407	1,854,252	336,794	388,082	44,798	712,650	76,107	1,570,974	84.7	283,278	191,017	223,650	184,007
Elgin, Joliet & Eastern	Oct.	459	1,910,958	5	2,073,982	209,034	469,239	13,135	682,423	44,391	1,418,409	68.4	655,573	494,476	352,924	569,748
	10 mos.	459	19,148,265	148	20,930,751	1,880,048	4,930,838	128,797	7,067,873	442,280	14,447,167	69.0	6,483,584	5,431,762	3,543,185	2,758,106
Erie R. R.	Oct.	2,055	7,319,795	984,239	9,165,053	992,635	2,294,081	140,414	3,665,582	286,179	7,423,818	81.0	1,741,235	1,372,652	1,378,663	1,946,907
	10 mos.	2,055	70,120,327	11,054,354	88,504,397	10,363,878	22,010,434	1,480,196	34,249,394	2,902,184	71,399,452	80.7	17,104,945	13,449,007	13,900,628	13,119,074
Chicago & Erie	Oct.	269	1,129,400	57,743	1,312,627	156,477	144,132	23,012	427,442	38,124	789,205	60.1	523,422	466,704	99,662	271,344
	10 mos.	269	10,220,557	617,161	11,780,415	1,340,779	1,428,078	231,976	3,752,213	390,149	7,129,627	60.5	4,650,788	4,092,783	1,333,267	1,008,225
New Jersey & New York	Oct.	45	28,171	101,276	135,409	21,215	22,642	1,621	69,865	3,778	119,115	88.0	16,294	13,454	—19,310	—19,543
	10 mos.	45	259,306	1,062,030	1,372,072	182,695	224,493	14,692	707,834	41,884	1,171,590	85.4	200,482	164,520	—154,116	—97,334
N. Y. Susquehanna & Western	Oct.	135	256,392	52,491	348,583	52,386	66,912	4,127	190,869	11,467	325,755	93.5	23,828	—7,965	—30,013	31,664
	10 mos.	135	3,275,255	574,207	4,283,473	505,183	608,797	41,630	2,063,938	116,134	3,335,465	77.9	948,008	656,987	477,937	—81,710
Evansville, Ind. & Terre Haute	Oct.	146	216,495	4,584	228,970	31,182	34,227	2,318	77,341	6,666	151,734	66.3	77,236	70,834	37,024	30,370
	10 mos.	146	1,895,383	42,987	2,006,632	308,570	329,079	18,743	664,107	43,489	1,363,653	68.0	642,979	580,573	311,147	111,229
Florida East Coast	Oct.	770	1,559,921	928,723	2,738,037	406,936	392,067	20,700	1,074,784	46,539	1,826,564	66.7	911,473	752,291	518,570	409,652
	10 mos.	770	13,196,591	7,755,704	23,454,118	3,343,435	3,085,632	200,755	8,652,134	405,306	15,667,543	66.8	7,786,575	6,549,349	4,713,951	3,644,011
Fort Smith & Western	Oct.	249	183,869	19,907	215,147	28,104	32,951	5,429	53,368	7,567	127,988	59.5	87,159	81,657	68,357	76,319
	10 mos.	249	1,249,163	170,587	1,510,100	244,312	271,953	52,504	463,627	75,509	1,110,958	73.6	399,142	343,093	208,212	128,242
Galveston Wharf Co.	Oct.	13	.....	.....	145,017	41,483	3,359	962	39,185	2,807	90,851	62.6	54,166	32,666	32,713	114,540
	10 mos.	13	.....	.....	1,304,231	495,207	40,467	9,786	337,626	26,961	969,395	74.3	334,836	144,758	143,728	167,442
Georgia R. R.	Oct.	328	405,670	88,496	537,537	80,951	105,478	23,232	229,132	21,256	460,301	85.6	77,236	69,761	45,928	109,287
	10 mos.	328	3,773,738	889,057	5,020,755	602,199	977,353	231,140	2,060,485	205,196	4,068,861	81.0	951,894	874,234	838,838	679,681
Georgia & Florida	Oct.	406	148,656	25,252	183,959	22,143	18,927	8,701	63,636	8,775	122,400	66.5	61,559	55,057	35,971	21,985
	10 mos.	406	1,239,707	186,133	1,502,935	200,039	172,497	79,358	547,533	77,152	1,078,778	71.8	424,157	358,590	192,861	176,846

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF OCTOBER AND TEN MONTHS OF CALENDAR YEAR 1925—CONTINUED

Name of road		Average mileage operated during period.	Operating revenues: Freight.	Passenger.	Total (inc. misc.)	Operating expenses: Maintenance of: Way and structures.	Equipment.	Traffic.	Transportation.	General.	Total.	Operating ratio.	Net from railway operation.	Operating income (or less).	Net after rents.	Net after rents, 1924.
Grand Trunk Western	Oct.	347	$1,448,850	$177,467	$1,721,101	$199,760	$407,770	$38,511	$588,608	$58,067	$1,301,936	75.6	$419,165	$354,922	$208,759	$74,406
	10 mos.	347	12,599,929	1,855,782	15,333,355	1,869,130	3,762,925	380,185	5,441,324	538,624	12,082,883	78.8	3,250,472	2,587,382	1,451,465	172,931
Atlantic & St. Lawrence	Oct.	166	81,294	24,988	117,188	38,877	24,747	5,933	90,925	8,724	170,268	145.3	—53,080	—67,831	—111,269	—114,538
	10 mos.	166	1,517,850	312,917	1,992,294	489,263	342,074	59,841	1,058,284	79,640	2,043,979	102.6	—51,685	—221,893	—797,622	—1,128,267
Chic., Det. & Canada Gr. Tr. Jct.	Oct.	59	283,303	4,075	342,051	37,329	12,325	4,241	102,864	3,855	160,593	47.0	181,458	173,434	136,100	75,748
	10 mos.	59	2,188,521	41,700	2,644,753	325,116	117,258	41,672	840,764	35,223	1,359,918	51.4	1,284,835	1,185,369	882,431	726,851
Det., Grand Haven & Milwaukee	Oct.	189	644,181	36,422	745,489	99,071	44,150	11,505	285,593	15,807	456,296	61.2	289,193	285,321	174,833	97,882
	10 mos.	189	5,033,360	333,393	5,893,262	724,423	477,676	113,309	2,460,673	168,179	3,944,617	66.9	1,948,645	1,904,641	919,160	384,523
Great Northern	Oct.	8,231	11,595,290	1,152,818	13,821,116	1,161,074	1,349,489	205,760	3,906,014	208,186	6,872,256	49.7	6,948,860	6,017,567	5,564,800	5,504,510
	10 mos.	8,245	73,910,234	11,678,632	94,658,930	12,740,505	14,394,662	1,938,512	31,683,721	2,246,189	63,725,194	67.3	30,933,736	22,832,261	21,975,119	17,911,970
Green Bay & Western	Oct.	234	159,929	5,315	172,787	28,899	18,717	5,084	48,761	3,070	104,468	60.4	68,319	58,319	54,669	26,610
	10 mos.	234	1,147,318	75,235	1,291,379	255,321	166,247	42,926	451,599	27,571	943,120	73.0	348,259	267,465	203,815	152,284
Gulf & Ship Island	Oct.	307	270,924	44,093	340,653	92,829	103,871	5,911	126,411	8,444	340,531	100.0	122	—17,470	—43,910	52,862
	10 mos.	307	2,427,895	405,124	3,096,105	566,770	512,861	71,746	932,790	133,667	2,301,178	74.3	794,927	503,912	349,854	527,667
Gulf, Mobile & Northern	Oct.	466	556,212	34,448	612,577	79,784	83,290	27,297	176,851	23,069	390,883	63.81	221,694	168,929	161,342	139,262
	10 mos.	466	4,685,575	324,475	5,215,657	763,278	834,593	234,335	1,508,125	242,723	3,587,628	68.79	1,628,029	1,234,590	1,146,960	1,023,133
Hocking Valley	Oct.	348	1,682,137	69,859	1,947,204	371,340	454,914	14,759	538,954	37,152	1,416,079	72.7	531,125	435,656	338,878	297,480
	10 mos.	348	14,069,146	669,905	16,216,132	2,217,988	4,521,590	145,137	4,704,270	394,186	11,969,715	72.8	4,246,417	3,255,168	2,797,210	3,062,103
Illinois Central	Oct.	4,874	11,719,426	2,046,361	14,757,357	2,434,089	3,224,588	250,320	4,737,482	322,100	11,029,135	74.7	3,728,222	2,662,529	2,651,130	1,997,292
	10 mos.	4,875	96,307,206	20,335,219	126,240,787	18,761,257	28,329,302	2,184,658	44,340,861	3,216,949	97,147,654	77.0	29,093,133	19,841,774	20,247,902	20,153,740
Yazoo & Mississippi Valley	Oct.	1,380	2,022,880	322,706	2,478,639	382,437	446,538	31,431	832,986	48,185	1,737,095	70.1	741,544	617,615	558,945	523,308
	10 mos.	1,380	16,172,379	2,738,555	19,968,856	3,037,417	3,468,514	292,671	7,065,233	479,584	14,305,402	71.6	5,663,454	4,385,772	3,937,878	3,170,186
Illinois Central Combined Report	Oct.	6,254	13,742,306	2,369,067	17,235,996	2,816,526	3,671,126	281,751	5,570,468	370,285	12,766,230	74.1	4,469,766	3,280,144	3,210,075	2,520,600
	10 mos.	6,255	112,479,585	23,073,774	146,209,643	21,798,674	31,797,816	2,477,329	51,406,094	3,696,533	111,453,056	76.2	34,756,587	24,227,546	24,185,780	23,323,926
Kansas City, Mexico & Orient	Oct.	272	156,026	7,812	172,587	41,562	45,854	4,737	61,317	6,055	159,525	92.4	13,062	9,062	3,167	9,983
	10 mos.	272	1,948,163	80,430	2,105,928	398,897	517,282	54,857	728,002	174,148	1,872,515	88.9	233,413	164,481	401	—40,160
Kans. City, Mex. & Orient of Tex.	Oct.	465	222,128	18,608	254,007	53,457	51,635	5,275	97,505	6,015	213,865	84.2	40,142	33,142	11,400	14,724
	10 mos.	465	2,449,885	144,623	2,687,957	544,198	581,186	60,718	892,021	62,863	2,140,583	79.6	547,374	476,965	263,587	103,852
Kansas City Southern	Oct.	784	1,403,809	120,517	1,681,154	210,607	267,937	46,097	498,090	83,086	1,105,774	65.8	575,380	467,792	421,627	353,876
	10 mos.	776	12,336,720	1,328,133	15,115,113	2,071,023	2,674,732	453,935	4,808,217	761,859	10,755,621	71.2	4,359,492	3,399,939	3,090,971	2,540,076
Texarkana & Ft. Smith	Oct.	81	202,662	11,406	231,187	23,317	16,639	6,123	65,656	10,690	123,169	53.3	108,018	92,114	68,814	47,383
	10 mos.	81	2,167,578	113,140	2,456,034	283,785	225,471	59,580	701,128	9,584	1,383,556	56.3	1,072,478	913,541	645,205	743,223
Kansas, Oklahoma & Gulf	Oct.	314	263,851	7,882	277,681	77,713	33,550	10,631	88,999	8,163	218,965	78.9	58,716	49,789	32,559	18,857
	10 mos.	314	1,869,710	73,852	1,997,328	582,962	334,966	88,295	756,413	94,067	1,855,731	92.9	141,597	57,796	—56,916	3,746
Lake Superior & Ishpeming	Oct.	161	265,247	2,269	305,733	34,315	23,849	457	67,517	4,718	130,628	42.7	175,105	149,418	147,108	90,201
	10 mos.	161	1,707,463	32,633	1,979,037	361,825	249,682	4,812	495,206	50,749	1,161,940	58.7	817,097	642,432	610,673	320,333
Lake Terminal	Oct.	13	.....	.....	108,147	16,556	20,774	.....	60,222	1,702	99,254	91.8	8,893	2,721	4,303	—4,525
	10 mos.	13	.....	.....	1,009,123	157,113	182,249	.....	569,213	17,276	925,851	91.7	83,272	22,946	44,633	—95,464
Lehigh & Hudson River	Oct.	96	209,152	2,495	223,642	32,874	37,051	2,167	93,798	10,315	176,192	78.8	47,450	34,350	14,245	32,876
	10 mos.	96	2,457,139	28,379	2,605,318	319,371	440,871	20,945	977,297	98,502	1,856,968	71.3	748,350	612,612	369,136	402,997
Lehigh & New England	Oct.	219	406,455	1,135	414,961	66,728	88,632	5,312	146,176	16,946	323,702	78.0	91,259	78,148	80,984	168,193
	10 mos.	219	4,645,868	14,546	4,742,017	653,398	1,069,663	55,389	1,470,088	183,251	3,428,677	72.3	1,313,340	1,128,388	1,127,024	1,032,835
Lehigh Valley	Oct.	1,363	4,802,705	638,402	5,894,306	772,736	1,423,430	129,356	2,437,908	137,394	4,932,216	83.7	962,090	735,774	686,261	1,193,198
	10 mos.	1,371	52,688,304	6,799,029	64,281,477	7,376,375	13,479,883	1,242,906	24,681,963	1,462,189	48,538,775	75.5	15,742,702	12,262,551	11,538,672	9,877,133
Louisiana & Arkansas	Oct.	302	337,332	21,001	367,393	77,904	58,723	11,682	94,722	13,425	255,740	69.6	111,653	73,991	63,199	61,230
	10 mos.	302	3,112,065	217,068	3,419,945	538,183	593,042	106,227	911,785	135,108	2,278,743	66.6	1,141,202	825,759	711,294	535,355
Louisiana Ry. & Nav. Co.	Oct.	337	316,994	21,370	356,271	91,316	64,457	10,636	128,033	9,696	303,532	85.2	52,739	32,730	—2,762	—55,414
	10 mos.	337	2,787,459	188,160	3,153,829	693,919	471,952	107,814	1,264,440	101,564	2,626,931	83.2	526,898	325,158	18,690	—142,513
Louisiana Ry. & Nav. Co. of Tex.	Oct.	206	128,654	10,746	144,881	13,534	13,583	3,483	56,636	6,459	93,284	64.4	51,597	47,591	27,323	11,507
	10 mos.	206	949,763	85,143	1,094,618	184,858	152,593	29,541	495,749	56,752	918,875	83.9	175,743	135,788	—33,911	—51,837
Louisville & Nashville	Oct.	5,044	10,458,495	1,906,551	13,142,831	1,738,816	2,918,521	237,245	4,301,417	265,906	9,502,508	72.3	1,640,323	2,916,105	2,985,695	2,693,605
	10 mos.	5,044	91,437,555	18,916,733	117,310,273	17,170,346	26,806,840	2,348,714	40,278,273	2,805,293	89,848,285	76.6	27,461,988	21,816,088	22,156,564	17,887,503
Louisville, Henderson & St. Louis	Oct.	199	279,233	57,591	357,142	71,653	31,510	7,802	98,256	9,242	218,463	61.2	138,679	110,775	101,933	60,988
	10 mos.	199	2,423,380	554,548	3,164,797	623,479	409,877	73,159	971,786	96,414	2,174,715	68.7	990,082	789,772	672,340	398,943
Maine Central	Oct.	1,207	1,366,636	268,804	1,794,247	253,722	381,910	14,837	669,961	48,363	1,368,812	76.3	425,435	324,633	320,791	231,173
	10 mos.	1,207	11,973,929	3,328,726	16,890,827	2,620,224	3,296,179	142,453	6,661,929	491,451	13,229,878	78.3	3,660,949	2,654,810	2,581,746	1,991,570
Midland Valley	Oct.	364	327,858	41,198	383,830	58,028	42,551	6,813	103,786	19,769	228,706	59.6	155,124	135,237	120,550	172,469
	10 mos.	364	3,135,808	403,601	3,682,709	610,374	454,263	62,944	1,037,214	188,065	2,336,135	63.4	1,346,574	1,747,751	999,849	986,012
Minneapolis & St. Louis	Oct.	1,627	1,284,580	95,978	1,452,599	163,682	274,716	35,379	576,826	45,653	1,096,005	75.5	356,594	291,975	211,025	178,754
	10 mos.	1,636	10,807,124	1,033,007	12,503,207	2,240,435	2,707,591	318,190	5,458,679	476,028	11,193,924	89.5	1,309,283	666,388	40,452	—1,045,190
Minneapolis, St. Paul & S. S. Marie	Oct.	4,400	4,304,389	487,113	5,177,686	589,538	853,194	72,385	1,676,906	112,068	3,324,414	64.2	1,853,272	1,480,082	1,274,526	1,728,977
	10 mos.	4,401	32,508,434	5,353,919	41,165,654	5,551,257	7,352,462	712,534	15,296,983	1,118,670	30,240,519	73.5	10,925,135	8,262,557	7,150,780	4,858,807
Duluth, South Shore & Atlantic	Oct.	590	407,836	75,495	532,898	82,609	79,061	7,330	208,172	10,485	392,506	73.7	140,392	112,392	87,469	64,405
	10 mos.	590	3,677,175	821,105	4,954,313	882,695	800,548	69,451	1,979,845	113,775	3,899,231	78.7	1,055,082	768,948	562,084	444,189
Spokane International	Oct.	165	102,070	12,159	121,527	18,674	12,993	3,117	37,847	7,042	80,759	66.5	40,768	34,553	23,474	—2,489
	10 mos.	165	853,415	127,928	1,043,913	163,099	90,961	32,110	341,078	65,675	707,870	67.3	341,043	287,986	209,289	98,161
Mississippi Central	Oct.	164	134,052	12,449	151,024	21,821	23,335	7,483	46,992	7,925	107,486	71.2	43,538	32,619	36,071	49,628
	10 mos.	172	1,201,278	121,496	1,370,897	189,029	230,018	71,193	369,994	83,651	943,601	68.8	427,296	307,978	364,094	417,369

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF OCTOBER AND TEN MONTHS OF CALENDAR YEAR 1925—CONTINUED

Name of road		Average mileage operated during period.	Operating revenues: Freight.	Passenger.	Total (inc. misc.)	Operating expenses: Maintenance of: Way and structures.	Equipment.	Traffic.	Transportation.	General.	Total.	Operating ratio.	Net from railway operation.	Operating income (or less).	Net after rents.	Net after rents, 1924.
Missouri & North Arkansas	Oct.	364	$121,311	$18,146	$150,068	$36,259	$29,404	$6,021	$56,245	$9,026	$136,955	91.3	$13,113	$10,730	—$4,289	$29,307
	10 mos.	364	1,029,872	170,872	1,291,041	291,797	233,011	54,326	503,817	73,082	1,155,144	89.5	135,897	114,355	10,916	43,475
Missouri-Kansas Texas	Oct.	1,799	2,579,943	414,297	3,249,580	454,629	793,693	57,097	765,378	95,054	2,171,186	66.8	1,078,394	843,043	863,042	1,001,895
	10 mos.	1,799	22,981,591	4,036,384	29,115,644	3,099,013	6,398,490	539,398	7,469,305	911,897	18,508,962	63.6	10,606,682	8,793,816	8,814,065	7,138,489
Mo. Kansas Texas of Texas	Oct.	1,389	1,597,518	394,071	2,165,171	321,978	196,797	42,875	754,906	67,608	1,395,922	64.5	769,249	716,659	552,294	788,653
	10 mos.	1,389	12,806,084	3,647,448	17,914,420	3,039,685	2,936,055	428,469	6,952,973	665,830	14,029,731	78.3	3,884,689	3,281,492	1,396,810	2,695,105
Missouri Pacific	Oct.	7,337	9,868,156	1,398,288	12,190,647	2,099,518	2,327,223	236,649	4,131,969	315,229	9,144,054	75.0	3,046,593	2,537,770	2,110,433	1,855,400
	10 mos.	7,337	86,328,817	13,764,296	108,314,427	16,877,443	21,591,720	2,581,515	40,173,537	3,280,995	85,050,276	78.5	23,264,151	18,990,450	14,549,788	12,593,781
Gulf Coast Lines	Oct.	922	937,766	187,133	1,180,366	208,981	250,862	38,226	315,775	56,583	874,611	74.1	305,756	244,447	244,837	287,063
	10 mos.	922	10,088,739	1,681,672	12,502,023	1,900,383	1,861,345	360,117	3,454,413	497,129	8,032,175	64.2	4,469,848	3,854,059	3,551,370	3,664,030
International-Great Northern	Oct.	1,159	1,304,464	198,337	1,651,657	262,485	230,892	31,498	586,494	56,641	1,152,721	69.7	398,936	461,771	392,615	474,508
	10 mos.	1,159	10,869,021	1,850,749	14,034,045	2,683,104	2,359,388	346,349	5,418,536	572,520	11,177,577	79.6	2,856,468	2,491,749	1,844,334	1,908,031
Texas & Pacific	Oct.	1,952	2,627,731	599,712	3,481,478	468,291	585,928	65,318	1,098,211	91,603	2,314,462	66.5	1,167,016	988,458	886,394	821,539
	10 mos.	1,952	20,798,852	5,381,865	28,305,842	4,205,206	5,640,690	633,389	10,091,313	940,649	21,502,797	76.0	6,803,045	5,288,607	4,597,963	4,116,550
Mobile & Ohio	Oct.	1,161	1,690,685	134,212	1,923,649	249,756	334,198	48,317	610,801	45,773	1,288,980	67.0	634,669	496,973	440,836	370,437
	10 mos.	1,161	13,754,288	1,332,469	15,960,565	2,257,309	2,761,761	493,608	5,489,908	451,254	11,452,770	71.8	4,507,795	3,549,459	3,094,633	3,094,113
Monongahela	Oct.	129	570,932	21,664	597,744	52,000	55,000	1,200	146,728	9,708	263,142	44.0	334,602	301,196	219,888	176,465
	10 mos.	130	4,471,638	234,273	4,751,150	593,500	610,000	11,408	1,219,213	96,484	2,525,818	53.2	2,225,332	2,002,391	1,386,769	776,231
Monongahela Connecting	Oct.	7	.....	.....	181,828	18,711	41,079	374	86,712	2,879	149,755	82.4	32,073	27,482	24,737	—1,255
	10 mos.	7	.....	.....	1,789,682	209,627	399,226	3,767	873,043	32,709	1,518,372	84.8	271,310	220,461	208,585	—6,502
Montour	Oct.	57	69,301	309	71,643	23,206	28,907	934	14,525	7,030	74,602	104.1	—2,959	—7,193	20,914	92,658
	10 mos.	57	792,505	5,378	808,925	204,416	363,492	9,378	203,119	72,006	852,411	105.4	—43,486	—85,400	217,117	471,281
Nashville, Chatt. & St. Louis	Oct.	1,259	1,716,325	428,209	2,322,624	289,587	473,569	72,869	811,789	73,457	1,736,167	74.8	586,457	511,313	523,116	418,668
	10 mos.	1,259	14,376,670	4,000,921	19,893,518	3,022,295	4,364,134	768,226	7,108,393	713,001	16,062,320	80.7	3,831,198	3,184,622	3,092,950	2,750,384
Nevada Northern	Oct.	165	84,173	8,005	100,612	20,633	7,309	946	17,336	5,318	51,712	51.4	48,900	39,664	40,125	51,471
	10 mos.	165	717,284	89,890	875,201	181,490	72,896	9,518	166,808	56,178	488,107	55.7	387,094	278,830	283,127	394,726
Newburgh & South Shore	Oct.	7	.....	.....	158,809	25,336	41,145	.....	70,682	4,076	141,269	71.0	57,540	43,731	44,906	13,454
	10 mos.	7	.....	.....	1,693,899	225,854	390,167	.....	666,883	43,926	1,326,830	78.3	367,069	234,998	276,447	112,260
New Orleans Great Northern	Oct.	274	220,357	27,886	256,983	27,794	50,166	6,398	71,805	10,380	166,546	64.8	90,437	75,470	67,206	48,741
	10 mos.	274	2,042,943	277,580	2,405,945	350,644	423,543	64,436	730,909	105,541	1,675,211	69.6	730,734	544,307	451,535	440,446
New York Central	Oct.	6,922	23,238,805	7,633,730	35,543,534	4,993,287	7,041,892	393,481	11,743,650	2,598,712	27,231,965	76.6	8,311,569	6,192,754	6,270,868	6,131,149
	10 mos.	6,922	198,298,507	81,123,161	319,859,417	42,768,274	66,022,333	3,787,786	110,496,311	10,640,226	237,847,345	74.4	82,012,072	60,272,348	58,187,858	54,509,774
Cincinnati Northern	Oct.	244	424,036	7,105	441,380	48,400	68,463	6,904	130,181	19,210	273,154	61.9	168,226	137,992	116,168	118,354
	10 mos.	244	3,716,327	86,776	3,892,874	458,730	637,768	61,963	1,212,405	107,192	2,476,314	63.6	1,416,560	1,160,064	850,179	733,867
Cleve., Cin., Chic. & St. Louis	Oct.	2,398	6,256,923	1,397,465	8,348,701	1,105,672	1,727,519	153,631	2,862,366	240,580	6,165,196	73.8	2,183,505	1,719,193	1,778,919	1,649,748
	10 mos.	2,398	56,148,082	13,586,643	75,992,300	9,346,154	15,118,763	1,302,291	26,796,358	2,216,071	55,424,242	72.9	20,568,058	15,968,266	15,047,455	11,740,618
Indiana Harbor Belt	Oct.	116	.....	.....	1,209,916	119,695	132,951	4,763	435,572	28,480	720,665	59.6	489,251	433,247	249,725	176,598
	10 mos.	116	.....	.....	9,349,949	1,083,921	1,171,397	47,864	3,716,015	234,656	6,251,254	66.9	3,098,695	2,670,113	1,643,591	757,414
Michigan Central	Oct.	1,862	5,678,213	1,663,210	8,294,625	972,389	1,420,069	111,298	2,583,466	319,681	5,486,270	66.1	2,808,355	2,281,788	2,227,660	1,906,257
	10 mos.	1,862	51,601,823	17,381,181	76,435,291	9,074,389	14,449,438	1,080,656	24,254,634	1,741,840	51,380,101	67.2	25,055,190	20,183,730	20,025,566	16,443,241
Pittsburgh & Lake Erie	Oct.	231	2,432,380	245,561	2,752,457	420,309	806,256	20,084	866,160	84,896	2,195,991	79.8	556,466	373,893	728,944	681,066
	10 mos.	231	23,148,653	2,500,327	26,589,147	3,774,020	8,091,956	236,343	8,544,307	740,264	21,383,846	80.4	5,205,301	3,423,080	7,062,942	6,719,539
New York, Chicago & St. Louis	Oct.	1,695	4,819,041	154,259	5,156,441	671,725	955,102	123,507	1,700,005	153,774	3,597,318	69.8	1,559,123	1,294,532	1,208,804	1,194,974
	10 mos.	1,695	42,239,577	1,650,320	45,489,832	6,002,289	8,303,190	1,214,567	15,774,393	1,572,441	32,629,769	71.7	12,860,063	10,369,416	9,050,677	7,525,986
N. Y., New Haven & Hartford	Oct.	1,918	6,221,537	4,159,122	11,874,349	1,635,104	2,414,938	85,155	4,007,898	294,230	8,607,126	72.5	3,267,223	2,832,542	2,284,689	1,912,172
	10 mos.	1,938	56,356,944	41,285,925	109,764,188	14,403,389	23,079,905	763,286	38,638,370	2,913,958	81,399,035	74.2	28,365,153	24,242,367	19,098.177	15,796,392
Central New England	Oct.	285	563.947	5,927	588,961	163,554	139,941	6,760	199,279	15.216	524,750	89.1	64,211	39,206	2,710	103,063
	10 mos.	288	5,984,492	84,175	6,267,936	1,237,550	1,145,087	61,371	2,006,568	152,836	4,603,395	73.4	1,664,541	1,415,898	1,031,982	1,301,752
New York Connecting	Oct.	20	139,713	.....	174,303	27,420	16,340	.....	50,969	1,393	96,122	55.1	78,181	41,781	38,283	117,816
	10 mos.	20	1,975,419	.....	2,248,673	198,146	124,554	.....	495,793	13.754	832,247	37.0	1,416.426	1,026,826	981,964	988,665
New York, Ontario & Western	Oct.	569	420,879	83,418	696,178	149,171	135,412	15,604	408,573	34,078	755,657	108.5	—59,479	—74,491	—100,225	120,823
	10 mos.	569	6,751,147	2,554,019	11,211,332	1,640,771	2,044,796	165,843	4,693,064	354,415	8,954,781	79.9	2,256,551	1,861,390	1,460,112	1,518,882
Norfolk & Western	Oct.	2,241	9,197,812	631,415	10,192,055	1,709,414	1,792,345	111,224	2,473,451	178,870	6,187,257	60.7	4,004.798	3,156,467	3,460,124	2,562,471
	10 mos.	2,240	76,521,304	6,699,481	86,389,979	12,364,887	18,339,934	991,624	23,215,960	1,743,079	56,444,928	65.3	29,945,051	23,368,144	25,469,340	14,882,490
Norfolk Southern	Oct.	931	745,844	71,455	869,486	102,858	131,690	23,397	312,388	28,531	598,864	68.9	270,622	226,312	195,059	138,049
	10 mos.	931	6,249,963	852,138	7,535,025	1,015,523	1,103,754	233,475	2,956,235	284,315	5,594,742	74.2	1,940,283	1,486,863	1,163,322	1,159,562
Northern Pacific	Oct.	6,696	8,957,503	979,000	10,685,622	959,941	1,489,319	161,398	3,053,612	239,020	5,940,441	55.6	4,745,181	3,774,588	4,094,711	3,916,207
	10 mos.	6,696	62,202,594	11,194,930	80,268,359	11,579,315	14,484,703	1,783,828	27,867,158	2,498,199	59,098,906	73.6	21,169,453	13,674,755	16,684,295	14,325,566
Northwestern Pacific	Oct.	493	494,232	156,700	714,871	122,761	77,175	6,083	252,763	17,463	476,135	66.6	238,736	197,657	177,792	117,490
	10 mos.	490	3,669,011	1,818,724	6,038,138	981,162	801,663	67,648	2,333,186	175,693	4,357,263	72.2	1,680,875	1,239,401	1,109,912	1,211,401

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF OCTOBER AND TEN MONTHS OF CALENDAR YEAR 1925—CONTINUED

Name of road		Average mileage operated during period.	Operating revenues: Freight.	Passenger.	Total (inc. misc.)	Operating expenses: Maintenance of Way and structures.	Maintenance of Equipment.	Traffic.	Transportation.	General.	Total.	Operating ratio.	Net from railway operation.	Operating income (or less).	Net after rents.	Net after rents, 1924.
Pennsylvania Railroad	Oct.	10,500	$43,783,149	$12,222,154	$62,600,963	$7,817,694	$14,416,277	$693,219	$21,287,652	$1,505,468	$46,587,082	74.4	$16,013,881	$12,558,556	$12,343,295	$8,743,197
	10 mos.	10,500	384,743,319	121,416,207	557,069,209	69,605,690	134,169,187	6,733,293	202,220,995	15,121,578	434,861,792	78.1	122,207,417	94,568,091	83,408,872	69,025,905
Baltimore, Chesapeake & Atlantic	Oct.	130	101,265	30,868	143,076	11,510	16,524	1,376	83,032	3,359	115,801	80.9	27,275	27,275	29,653	16,826
	10 mos.	130	839,233	379,240	1,293,799	134,512	306,101	20,921	804,076	34,574	1,300,184	100.5	—6,385	—38,691	—38,704	24,268
Long Island	Oct.	397	960,108	1,845,585	2,959,267	694,983	550,841	31,747	1,075,867	83,616	2,447,042	82.7	512,225	335,625	308,568	243,859
	10 mos.	397	8,942,646	20,667,773	31,463,240	4,359,425	5,057,166	241,765	11,975,452	703,249	22,431,251	71.3	9,031,989	7,124,503	5,983,351	4,177,641
West Jersey & Seashore	Oct.	368	436,773	471,552	984,290	247,598	234,204	25,939	490,864	32,675	1,033,179	105.0	—48,889	—67,161	—103,024	—26,868
	10 mos.	368	4,123,213	7,006,990	11,788,562	1,815,119	1,888,099	212,042	4,970,091	294,014	9,188,133	77.9	2,600,429	1,497,867	1,202,211	896,703
Peoria & Pekin Union	Oct.	19	23,622	2,331	160,197	33,503	14,111	1,247	74,605	7,788	131,254	81.9	28,943	1,943	26,447	22,841
	10 mos.	19	249,534	27,773	1,547,876	272,272	160,789	8,560	672,820	79,256	1,193,697	77.1	354,179	172,179	405,156	400,963
Pere Marquette	Oct.	2,263	3,700,870	269,544	4,255,831	367,031	808,962	54,652	1,356,583	103,396	2,679,001	62.9	1,576,830	1,382,168	1,260,941	1,178,029
	10 mos.	2,263	28,873,645	3,667,957	34,946,724	4,081,790	7,494,733	534,401	12,245,245	1,004,736	25,373,587	72.6	9,573,137	7,870,291	7,023,492	6,109,412
Pittsburgh & Shawmut	Oct.	102	131,728	2,587	137,809	20,643	37,107	1,777	38,438	6,745	104,710	76.0	33,099	32,913	42,056	27,951
	10 mos.	102	994,811	38,932	1,056,059	143,635	329,634	14,077	306,590	66,761	860,697	81.5	195,362	174,379	243,054	140,118
Pittsburgh & West Virginia	Oct.	92	402,794	5,804	443,034	30,695	82,771	8,342	85,710	17,478	236,537	53.4	206,497	152,258	228,637	172,666
	10 mos.	92	3,606,050	69,506	4,012,639	387,732	927,734	65,199	780,394	173,882	2,450,265	61.1	1,562,374	1,109,574	1,743,589	1,307,670
Fittsburgh, Shawmut & Northern	Oct.	210	181,620	2,134	188,109	31,556	40,187	1,709	63,639	5,506	142,597	75.8	45,512	42,792	34,383	35,223
	10 mos.	210	1,481,889	330,090	1,555,445	282,357	359,767	18,335	550,237	61,222	1,271,918	81.8	283,527	256,512	187,242	—5,078
Quincy, Omaha & Kansas City	Oct.	250	82,613	17,125	107,082	59,706	15,866	906	38,358	2,290	116,736	108.6	—9,254	—13,892	—18,668	—6,688
	10 mos.	250	614,399	159,789	849,942	318,845	139,194	8,461	423,341	26,372	913,002	107.5	—63,960	—110,313	—141,706	—133,630
Reading Company	Oct.	1,139	6,046,723	796,072	7,261,311	1,122,921	1,511,742	72,962	2,669,244	165,823	5,532,262	76.2	1,729,049	1,352,104	1,560,437	2,072,237
	10 mos.	1,139	65,191,639	8,269,340	77,039,710	10,254,064	17,180,939	719,607	27,721,358	1,760,608	57,580,577	74.7	19,459,133	15,779,009	17,123,925	15,899,755
Atlantic City	Oct.	161	133,751	157,833	304,323	111,769	22,960	900	191,985	4,595	332,344	109.2	—28,021	—60,271	—87,872	—82,680
	10 mos.	168	1,371,412	2,970,405	4,522,911	884,579	388,174	79,671	2,171,676	50,975	3,576,174	79.1	946,737	710,202	383,475	85,678
Perkiomen	Oct.	41	129,649	4,613	138,305	11,747	6,528	107	51,112	806	70,350	50.9	67,955	62,851	57,210	28,492
	10 mos.	41	1,051,791	61,778	1,149,729	100,555	55,177	1,080	467,694	7,951	632,945	55.1	516,784	465,089	412,596	302,772
Port Reading	Oct.	19	146,406	.....	186,521	24,656	7,978	229	63,136	1,410	97,409	52.2	89,112	73,285	27,031	35,119
	10 mos.	19	1,530,988	.....	2,111,845	239,733	95,842	.....	662,928	25,876	1,026,233	48.6	1,085,612	928,173	291,727	82,634
Richmond, Fred'ksburg & Potomac	Oct.	117	432,884	406,290	1,045,126	150,471	176,965	8,709	392,329	32,535	771,524	73.8	273,602	216,300	169,068	180,011
	10 mos.	117	5,063,607	3,819,358	10,675,833	1,084,898	1,615,400	89,378	3,402,913	345,931	6,817,756	63.9	3,858,077	3,220,641	2,652,078	2,206,930
Rutland	Oct.	413	335,221	96,032	552,605	119,369	113,189	10,564	212,976	13,229	471,524	85.3	81,081	54,596	61,532	69,517
	10 mos.	413	3,177,254	1,005,013	5,406,392	1,046,767	1,070,925	99,560	2,189,136	134,711	4,557,746	84.3	848,646	583,520	674,896	717,152
St. Louis-San Francisco	Oct.	4,902	6,540,298	1,506,926	8,595,603	1,130,368	1,429,513	103,083	3,004,726	241,002	5,888,068	68.5	2,707,535	2,188,516	2,046,009	2,387,784
	10 mos.	4,902	55,196,580	13,970,299	74,139,666	9,033,897	14,388,580	1,056,561	24,894,523	2,297,689	51,481,787	69.4	22,657,879	18,601,876	18,009,434	16,870,735
Ft. Worth & Rio Grande	Oct.	233	101,989	19,219	133,821	35,675	22,187	3,134	58,897	4,512	124,405	93.0	9,416	5,380	—4,753	3,040
	10 mos.	233	826,166	189,587	1,116,000	260,366	226,579	31,729	547,002	47,312	1,112,180	99.7	3,820	—36,800	—131,417	16,428
St. Louis, San Francisco & Texas	Oct.	137	181,145	13,281	202,305	36,334	27,731	5,603	62,811	7,554	140,033	69.2	62,272	59,332	35,190	58,994
	10 mos.	137	1,601,269	126,537	1,789,577	281,836	283,023	50,810	617,192	72,321	1,304,213	72.9	485,364	460,396	211,168	137,011
St. Louis Southwestern	Oct.	940	1,496,077	150,799	1,746,166	351,555	307,245	57,514	412,246	65,017	1,211,552	69.4	534,614	447,045	379,455	501,503
	10 mos.	943	12,773,081	1,303,989	14,888,984	2,248,679	3,129,867	522,229	3,683,291	630,658	10,372,685	69.7	4,516,299	3,903,620	3,194,780	3,191,079
St. Louis Southwestern of Texas	Oct	807	672,704	84,531	817,077	196,644	142,534	24,935	278,713	34,084	679,873	83.2	137,204	110,135	156,744	140,224
	10 mos.	807	5,223,773	728,980	6,425,968	1,567,552	1,663,544	230,221	2,514,894	317,749	6,313,054	98.2	112,914	—157,492	316,401	298,929
San Antonio, Uvalde & Gulf	Oct.	318	76,925	17,651	105,880	21,081	15,219	4,403	42,559	5,823	89,085	84.1	16,795	12,533	11,921	6,542
	10 mos.	318	954,235	164,023	1,229,379	203,706	146,964	47,482	490,186	61,882	949,542	77.2	279,837	241,890	152,363	136,183
Seaboard Air Line	Oct.	3,790	4,182,866	1,266,716	6,008,211	965,633	893,051	205,800	2,115,160	182,116	4,450,660	74.1	1,557,551	1,319,858	1,063,213	731,717
	10 mos.	3,768	35,858,122	10,187,266	50,993,446	6,766,884	8,254,422	1,766,608	18,924,803	1,746,069	38,193,131	74.9	12,800,315	10,415,202	8,810,619	7,284,851
Southern Ry.	Oct.	6,885	10,124,475	2,654,939	13,901,740	1,858,737	2,222,617	245,565	4,394,094	325,911	9,148,196	65.8	4,753,544	3,755,563	3,658,005	3,272,053
	10 mos.	6,871	88,059,900	25,531,861	123,026,510	17,530,026	21,514,591	2,353,380	41,006,791	3,183,720	86,461,847	70.3	36,564,665	28,820,716	28,202,324	23,991,235
Alabama Great Southern	Oct.	318	712,030	169,324	946,812	140,990	160,061	21,483	260,905	22,847	612,141	64.8	333,671	264,417	291,365	287,534
	10 mos.	318	6,439,942	1,660,295	8,614,409	1,322,660	1,600,884	211,851	2,566,007	238,412	6,007,078	69.7	2,607,331	2,061,768	2,267,824	1,972,824
Cin., New Orleans & Tex. Pacific	Oct.	338	1,560,821	415,074	2,102,647	215,622	340,336	42,021	529,916	52,671	1,200,007	57.1	902,640	775,372	770,721	536,832
	10 mos.	338	14,566,321	3,684,021	19,292,731	2,491,564	3,407,377	429,799	5,252,503	497,012	12,236,521	63.4	7,056,210	6,006,096	5,865,868	4,563,806
Georgia Southern & Florida	Oct.	401	433,502	197,014	673,384	63,472	110,230	19,517	305,881	10,940	514,589	76.4	158,795	128,259	66,779	94,940
	10 mos.	401	3,463,462	1,515,198	5,424,454	652,325	723,259	132,197	1,929,019	105,939	3,594,254	66.3	1,830,200	1,524,806	1,118,208	557,647
New Orleans & Northeastern	Oct.	207	459,004	80,956	581,955	65,547	87,242	12,373	154,691	13,891	337,777	58.0	244,178	186,632	153,150	137,988
	10 mos.	207	3,827,680	804,415	4,971,137	632,920	763,716	123,068	1,390,718	146,929	3,096,404	62.3	1,874,733	1,348,250	1,155,495	1,003,083
Northern Alabama	Oct.	110	127,237	10,434	141,947	27,556	5,852	2,670	43,006	2,797	81,881	57.7	60,066	50,930	21,110	22,465
	10 mos.	110	1,177,723	100,496	1,309,233	233,992	48,768	23,384	394,379	30,399	730,793	55.8	578,440	512,512	226,635	164,462
Southern Pacific	Oct.	8,720	16,332,344	3,281,835	21,161,076	2,166,743	2,585,985	334,056	6,844,709	572,997	12,762,942	60.3	8,398,134	6,543,815	5,942,989	4,989,589
	10 mos.	8,721	123,358,713	35,934,551	175,264,572	23,719,954	28,032,069	3,159,269	62,126,194	5,748,708	125,167,782	71.4	50,096,790	35,541,366	32,818,323	34,812,983

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF OCTOBER AND TEN MONTHS OF CALENDAR YEAR 1925—CONTINUED

Name of road		Average mileage operated during period.	Operating revenues			Operating expenses						Operating ratio.	Net from railway operation.	Operating income (or less).	Net after rents.	Net after rents, 1924.
						Maintenance of										
			Freight.	Passenger.	Total (inc. misc.)	Way and structures.	Equipment.	Traffic.	Transportation.	General.	Total.					
Atlantic Steamship Lines	Oct.	...	$994,968	$52,391	$1,151,985	$16,431	$180,876	$17,456	$730,765	$40,796	$986,324	85.6	$165,661	$150,938	$150,807	$164,873
	10 mos.	...	7,793,528	449,459	9,467,193	157,832	2,180,307	178,845	6,677,402	331,990	9,526,376	100.6	—59,183	—205,218	—207,249	219,776
Galveston, Harrisburg & S. Antonio	Oct.	2,096	2,116,677	433,806	2,733,066	373,712	385,540	52,431	997,771	118,375	1,942,250	71.1	790,816	693,229	632,617	1,155,489
	10 mos.	2,101	18,499,612	4,300,449	24,419,367	4,532,980	4,887,133	537,750	8,737,431	1,150,711	20,043,106	82.1	4,376,261	3,502,245	2,804,336	4,918,995
Houston & Texas Central	Oct.	929	956,594	258,287	1,307,361	180,754	255,191	24,690	443,684	51,294	954,631	73.0	352,730	257,770	199,946	579,442
	10 mos.	929	8,782,386	2,488,336	12,083,387	2,241,962	2,380,091	271,690	4,129,320	479,747	9,508,818	78.7	2,575,069	1,923,538	1,447,411	1,600,353
Houston, East & West Texas	Oct.	191	303,570	46,088	365,219	42,797	52,382	3,790	100,080	10,361	209,399	57.3	155,820	141,220	118,460	108,991
	10 mos.	191	2,320,072	394,104	2,841,046	526,951	519,152	37,849	931,766	93,109	2,105,899	74.1	735,147	625,012	444,308	115,022
Louisiana Western	Oct.	207	314,288	81,116	420,815	36,238	72,293	13,182	123,721	18,789	268,317	63.8	152,498	114,833	100,143	117,101
	10 mos.	207	2,505,803	782,804	3,518,324	533,848	701,525	128,192	1,085,154	191,323	2,679,110	76.1	839,214	593,709	507,176	675,266
Morgan's L. & T. R. R. & S. S. Co.	Oct.	400	592,929	125,083	783,153	109,195	144,679	21,614	329,598	37,695	647,818	82.7	135,335	85,441	53,185	90,127
	10 mos.	400	5,072,435	1,241,107	6,830,484	1,094,629	1,615,826	207,002	2,943,523	378,953	6,286,534	92.0	543,950	37,990	—268,110	—225,076
Texas & New Orleans	Oct.	544	816,976	160,076	1,043,376	148,511	192,537	13,187	329,179	34,895	722,198	69.2	321,178	289,357	251,795	112,301
	10 mos.	540	7,238,100	1,504,186	9,268,369	1,535,474	2,029,789	138,577	3,131,506	336,958	7,203,332	77.7	2,065,037	1,742,801	1,400,346	239,338
Spokane, Portland & Seattle	Oct.	554	674,148	112,550	862,337	81,827	92,359	11,237	246,546	21,567	462,412	53.6	399,925	323,588	306,625	339,585
	10 mos.	554	4,826,426	1,240,729	6,751,813	906,124	1,002,012	107,290	2,124,159	210,999	4,434,723	65.7	2,317,090	1,560,345	1,374,395	1,761,791
Tennessee Central	Oct.	296	254,774	34,405	305,667	52,505	50,534	7,172	107,106	12,408	229,659	75.1	76,008	67,355	40,652	56,671
	10 mos.	296	2,150,576	366,159	2,669,143	465,082	414,661	73,424	952,792	110,028	2,016,130	75.5	653,013	578,790	357,612	374,633
Terminal Railroad Assn. of St. L.	Oct.	37	.....	.....	491,278	184,307	59,621	1,025	162,419	8,420	419,419	85.4	71,859	—12,259	101,494	220,273
	10 mos.	37	.....	.....	4,280,093	794,202	461,186	10,099	1,505,262	85,888	2,891,203	67.6	1,388,890	721,401	1,728,360	1,538,828
East St. Louis Connecting	Oct.	1	.....	.....	198,750	26,799	15,798	325	66,140	2,507	111,569	56.1	87,181	81,637	60,763	73,952
	10 mos.	1	.....	.....	1,874,751	236,803	121,388	3,195	672,407	30,636	1,064,429	56.8	810,322	759,676	553,632	534,509
St. L. Merchants' Bridge Term.	Oct.	9	.....	.....	476,472	61,716	40,781	969	189,915	6,652	300,033	63.0	176,439	139,898	155,103	120,078
	10 mos.	9	.....	.....	4,077,974	741,724	290,187	9,552	1,778,577	75,590	2,895,630	71.0	1,182,344	886,931	940,612	608,507
St. Louis Transfer Ry.	Oct.	6	.....	.....	64,260	10,399	7,094	175	32,058	1,184	50,910	79.2	13,350	12,816	7,502	15,380
	10 mos.	6	.....	.....	645,832	108,370	56,735	1,721	341,957	16,911	525,694	81.4	120,138	116,043	59,087	38,687
Toledo, Peoria & Western	Oct.	247	117,681	22,741	152,972	26,285	41,528	2,069	71,176	6,839	147,897	96.7	5,075	—12,925	—19,058	—19,336
	10 mos.	247	1,003,983	239,008	1,355,798	255,571	386,517	22,132	689,622	70,158	1,423,805	105.0	—68,007	—152,065	—227,887	—40,234
Trinity & Brazos Valley	Oct.	367	203,147	12,617	223,967	73,647	21,683	4,322	92,181	11,880	203,464	90.8	20,503	12,796	—9,762	53,843
	10 mos.	368	1,852,450	118,894	2,045,732	615,537	471,799	40,507	929,433	117,399	2,170,577	106.1	—124,845	—202,857	—448,855	—393,148
Ulster & Delaware	Oct.	128	37,386	8,698	80,836	13,295	10,698	1,341	45,682	6,017	77,033	95.3	3,803	—1,697	—4,363	10,434
	10 mos.	128	550,626	299,152	1,207,464	197,782	171,877	18,586	579,963	61,692	1,029,900	85.3	177,564	122,562	67,041	129,815
Union Railroad of Penna.	Oct.	45	.....	.....	1,026,577	88,506	155,487	177	416,510	9,837	670,517	65.3	356,060	289,829	322,691	228,857
	10 mos.	45	.....	.....	9,702,950	971,946	2,236,156	1,806	4,132,525	98,265	7,440,658	76.7	2,262,292	1,939,827	2,432,935	1,267,667
Union Pacific	Oct.	3,687	11,937,187	1,380,971	14,222,318	1,163,745	2,072,003	150,524	3,538,692	304,524	7,430,536	52.2	6,791,782	6,277,619	5,599,750	4,588,475
	10 mos.	3,687	68,183,216	14,205,426	90,434,629	10,874,107	17,741,720	1,611,896	24,185,134	2,828,981	59,116,593	65.4	31,318,036	25,409,186	23,534,149	22,676,134
Oregon Short Line	Oct.	2,444	3,734,441	366,599	4,298,584	441,795	577,297	46,260	1,150,923	119,970	2,386,587	55.5	1,911,997	1,689,110	1,501,678	920,314
	10 mos.	2,433	22,524,198	4,071,584	28,674,720	5,079,916	4,967,730	492,274	8,710,373	1,084,457	20,922,090	73.0	7,752,630	5,426,628	4,741,082	4,233,063
Oregon, Wash. R. R. & Nav. Co.	Oct.	2,237	2,290,313	312,717	2,807,826	469,474	391,303	64,073	1,013,366	117,139	2,083,024	74.2	724,802	553,141	365,338	521,066
	10 mos.	2,237	17,276,383	3,818,413	23,148,418	4,368,576	3,597,598	660,614	8,735,814	1,147,524	18,802,131	81.2	4,346,287	2,644,333	1,602,960	2,425,818
Los Angeles & Salt Lake	Oct.	1,207	1,833,011	380,598	2,406,564	521,735	453,491	63,062	779,659	66,611	1,962,590	81.6	443,974	309,611	185,421	198,616
	10 mos.	1,207	14,037,550	4,316,849	20,234,489	3,361,859	3,783,958	656,691	6,723,062	659,273	15,957,367	78.9	4,277,122	2,923,288	2,080,471	1,750,426
St. Joseph & Grand Island	Oct.	258	364,842	17,485	399,092	47,831	42,933	3,003	136,242	12,280	242,289	60.7	156,803	144,732	124,907	57,246
	10 mos.	258	2,449,288	189,772	2,813,407	505,237	441,618	28,857	1,010,760	122,290	2,109,245	75.0	704,162	582,680	438,689	254,860
Utah	Oct.	102	193,286	222	194,652	26,458	33,813	434	38,958	3,863	108,526	55.7	86,426	80,014	73,160	45,281
	10 mos.	102	1,397,495	2,715	1,409,133	180,337	381,669	3,796	306,580	63,571	935,935	66.4	473,198	398,721	353,247	193,859
Virginian	Oct.	545	1,580,628	49,411	1,741,615	188,371	339,782	13,439	406,121	36,178	977,451	56.1	764,164	667,307	777,777	757,284
	10 mos.	545	14,026,865	573,517	15,673,780	2,290,793	3,433,197	131,215	3,710,446	336,478	9,838,313	62.8	5,835,467	4,741,224	5,173,490	4,567,969
Wabash	Oct.	2,524	5,391,538	783,911	6,639,832	938,353	1,050,267	156,916	2,226,522	170,589	4,574,009	68.9	2,065,823	1,793,074	1,598,074	1,268,138
	10 mos.	2,524	45,671,521	7,768,735	57,544,364	8,340,287	10,350,269	1,508,256	20,942,317	1,634,937	43,049,864	74.8	14,494,500	12,003,514	9,331,972	7,528,405
Western Maryland	Oct.	804	1,629,783	43,756	1,732,317	194,254	390,032	36,344	503,395	47,632	1,180,162	68.1	552,155	487,155	453,240	354,621
	10 mos.	804	15,031,253	575,794	16,373,846	2,097,091	3,551,942	370,722	4,728,425	446,054	11,299,744	69.0	5,074,102	4,434,102	4,030,148	2,941,946
Western Pacific	Oct.	1,042	1,695,612	168,776	2,051,614	197,615	225,149	38,732	608,801	35,129	1,198,746	58.4	852,868	773,469	754,364	638,495
	10 mos.	1,042	10,136,511	1,779,788	13,009,155	1,939,321	2,051,594	387,778	4,345,426	355,956	9,537,062	73.3	3,472,093	2,680,726	3,518,960	2,393,103
Wheeling & Lake Erie	Oct.	511	1,855,382	37,053	2,040,386	278,975	411,030	36,235	557,034	65,527	1,350,762	66.2	690,024	541,645	518,779	291,832
	10 mos.	511	15,509,169	465,121	17,054,973	2,279,518	3,879,314	299,926	5,013,782	503,081	11,996,867	70.3	5,058,106	3,719,719	3,648 583	2,016,304

A.R.A. Purchases Williams' Car Patents

The American Railway Association has acquired the rights to the patent of William Erastus Williams, which, among other things, covers roof construction involving the use of a Z-bar side plate so arranged that the Z-bar, in addition to being a connection between the roof and side members of the car, forms a part of the water shedding surface of the roof. In its Circular No. 2569, dated December 1, the association states that "All railroads in the United States and all railroads in Canada and Mexico having lines running into the United States, car owners operating in the United States, and car manufacturing companies may use the construction covered by this patent free from any royalty or payment of any kind." The patent is held by H. J. Forster, secretary of the American Railway Association, as trustee for the benefit of the association.

Wage Statistics for September

Class I railroads reported to the Interstate Commerce Commission a total of 1,803,527 employees for the month of September, 1925, an increase of 3,308 or 0.2 per cent over the number reported for the previous month. The total compensation, however, decreased $2,789,290 or 1.1 per cent. This decrease in compensation is due largely to the fact that September has one less working day than August. Compared with the returns for the same month last year, the employment in September, 1925, shows an increase of 0.1 per cent and the total compensation an increase of 1.5 per cent.

The number of employees at the middle of the month was as follows:

Group	September, 1925	Increase over August, 1925	Increase over September, 1924
Executives, officials and staff assistants	16,503	31	269
Professional, clerical and general	282,617	(d) 324	1,314
Maintenance of way and structures	428,808	(d) 3,014	8,083
Maintenance of equipment and stores	512,301	(d) 1,334	(d) 14,950
Transportation (other than train, engine and yard)	212,213	3,703	1,229
Transportation (yardmasters, switch-tenders and hostlers)	23,915	(d) 121	(d) 214
Transportation (train and engine service)	327,170	4,367	6,500
Total	1,803,527	3,308	2,231

(d) Decrease.

Federal Court Rejects Commission's Final Valuation in Los Angeles Case

In the United States Court for Southern California, in the suit of the Los Angeles & Salt Lake, begun in 1923, to enjoin the enforcement of the I. C. C.'s order fixing the final valuation of the railroad company's property, Judges Ross, McCormick and James, in an opinion written by Judge Ross, have handed down a sweeping decision in favor of the railroad, annulling the valuation made by the commission and enjoining it from enforcing its orders. The court reaffirms its decision of last May overruling the objections of the commission to the taking of jurisdiction by this court.

The commission fixed the value of the railroad's property, including lands used by it as a common carrier, as of July 1, 1914, at $45,371,000, while the railroad company claimed that the true value was $70,000,000. The court finds conclusive evidence that the value of the property on the date given was greatly in excess of the sum set by the commission, but does not attempt to set a value; it simply rejects the commission's computation. The commission held that the property had a certain value for rate making as distinguished from "value," unqualified.

The decision says that the action of the commission must be in accordance with Section 15A of the Transportation act, which requires that consideration shall be given to all "elements of value which are recognized by the law of the land." Defining the term "the law of the land" the court cites the decision of the Circuit Court of the United States for Southern California, in the San Diego land case (affirmed by the Supreme Court, 174 U. S., 739 and 189 U. S., 430). In that case it was held that, in fixing rates for furnishing water, the "true actual value" of the property used in the business, was to be ascertained.

In its conclusion the court says "in no place in any of the statutes do we find any authority to decide that any property of a common carrier used in its transportation business has two kinds of value." It is understood that the Interstate Commerce Commission will take an appeal to the Supreme Court.

Traffic News

The formation of a national shippers' advisory board, to deal with car service problems, will be considered at a joint conference of officers of the 12 regional advisory boards, the railways and the American Railway Association, to be held in Chicago on January 7, 8 and 9, 1926.

The Chicago & Eastern Illinois, in conjunction with the Louisville & Nashville, operated an excursion from Chicago to Biloxi, Miss., Gulfport, Pass Christian and New Orleans, La., on December 4 and 5 at rates approximately equal to the one-way fare, with a return limit to December 22. The excursion tickets were accepted on through trains and sleeping cars.

The Interstate Commerce Commission has issued Service Order No. 42, declaring an emergency to exist because of the inability of the Seaboard Air Line currently to transport all freight traffic offered it for transportation over its line between Waldo, Fla., and Plant City, Fla., and authorizing the routing of freight over the new line of the Brooksville & Inverness from Inverness, Fla., to Brooksville, Fla., upon its completion on December 6.

Central Western Regional Advisory Board Meets

The Central Western Regional Advisory Board met at Alliance, Neb., on December 1, with an attendance of 290 representatives of shippers, railways and the government, including representatives from 53 cities in 13 states. The meeting was devoted to the consideration of reports of the commodity committees and the state chairmen. Hale Holden, president of the Chicago, Burlington & Quincy, discussed the competition of airplanes, motor trucks, buses and waterways, saying that although the airplane and the motor truck were not materially reducing the railroads' freight business, the privately owned pleasure cars were decreasing the local passenger train patronage. He urged that the establishment of waterways should be dealt with in the same manner as the establishing or abandoning of a railroad, with public hearings to determine the needs for such increase or decrease in transportation needs. He stated that there is adequate service in the United States at present and that additional carriers (water carriers) will only divide the bulk of the shipping now being handled by the railroads and tend to cause an increase in freight rates.

Secretary of Agriculture Calls for Readjustment of Freight Rates

Substantial readjustments in freight rates are declared necessary by Secretary Jardine of the Department of Agriculture in his annual report. "High freight rates constitute one of the many causes that have contributed to the depression in farm prices, especially in areas distant from the market," he said. "It is generally conceded that the entire freight-rate structure needs overhauling. Freight rates the country over have grown up in a haphazard way and as a result of all sorts of local considerations. It is my opinion that a careful study should be made of the entire freight-rate structure. On the basis of such a study it should be possible to make rate adjustments that take into account the market value of farm products as reflected over a reasonable period of years and likewise the influence of freight rates on the economic development of different regions and of the country as a whole. I realize that adequate income to the carriers must be fully reckoned with as a factor in rate making, because efficient and adequate railroads are indispensable to a profitable agriculture.

"There have been only minor changes in the freight rates on farm products in the last year. Our index showing changes in freight rates of 50 representative agricultural commodities stood on January 1 at 158.2, or 58 per cent above the 1913 level. Since then there have been no changes great enough to affect the index.

"In relation to pre-war conditions, the prices of farm products are not yet on a par with freight rates. The level of farm commodity prices in September was 144 per cent of the pre-war average, whereas freight rates on agricultural commodities were 158 per cent of the pre-war average. Moreover, the prices of agri-

cultural products fluctuate greatly from year to year, whereas freight rates are stable and are not frequently changed. The burden of the post-war increase in freight rates fell heavily on agriculture because the rates were increased just as agricultural prices started downward and remained high while agriculture was undergoing a very severe depression. The ability of agriculture to pay transportation charges should not be reckoned on the conditions of any given year, but on probable future conditions, unless freight rates can be made more flexible, being raised when prices are high and lowered when they decline, within reasonable limits."

Increases in Chicago Suburban Fares

A 15 per cent increase in suburban fares on all the railroads entering Chicago except the Chicago & North Western, which has already made a 20 per cent increase, were authorized by the Illinois Commerce Commission on December 9, to go into effect on January 1. The railroads had applied to the commission for a 20 per cent increase. The North Western had applied to the Illinois commission last spring and later applied to the Interstate Commerce Commission; and the latter commission ordered the increased rates put into effect in October; but the Illinois commission refused to withdraw its ruling suspending them. Later the railroad secured an injunction in the U. S. court restraining the Illinois commission from interfering and made the increase effective on October 23. The present order of the Illinois commission states that regardless of its opinion the railroads can sustain their position by the procedure adopted by the North Western and thereby be allowed to make a 20 per cent increase.

Western Rate Hearing at Minneapolis

The hearing before the Interstate Commerce Commission on the application of western railroads for an increase of 5 per cent in freight rates, which opened on November 30, was adjourned at Minneapolis, Minn., on December 2, with the testimony of representatives of farm organizations, state commissions and fruit growers, who entered objections to the increase. Among those entering objections were the western fruit growers, the Washington State Department of Public Works, the American Linseed Company of Minneapolis and the Minnesota Farm Bureau Federation.

J. F. Reed, president of the Minnesota Farm Bureau Federation, asserted that an increase in freight rates in the northwest would cause more shippers within a certain radius of St. Paul markets to resort to the use of automobile truck lines to transport their stock and farm products. He supported his statement by showing that with the present freight rates truck service has been steadily on the increase since 1915, with an especially rapid growth in the last few years. He also said shippers are now considering the establishment of a freight truck service. He cited figures showing that cattle trucked into South St. Paul from 1920 to 1924, inclusive, numbered 122,257 head as against 60,766 from 1915 to 1920. The number of calves hauled in by truck increased five times, hogs three times and sheep five times in the same period.

In discussing the effect of increased freight rates on the farmers of Minnesota and the northwestern states, he said that this year the farmers have lost $92,000,000 as compared with the returns in 1924. In this period the actual agricultural income from Minnesota, North Dakota, South Dakota and Montana, was $1,067,000,000 as compared to an income of $975,000,000 in 1925. The value of Minnesota cattle, hogs, poultry and dairy products, he said, decreased from $583,652,000 in 1924 to $516,163,000 in 1925. The value of the 1925 grain crop is $70,000,000 less than that of 1924. The return on wheat, hogs, beef, corn and potatoes showed less net return for 1924 than in 1923.

John E. Benton, acting for the state commission of Minnesota, presented a motion calling for denial of the petition of the railroads for a readjustment of the entire western class rate structure. Examiner Keeler would not permit the motion to appear on the records but suggested that it be filed direct with the federal commission. The document was signed by representatives of the Wisconsin, Iowa, Nevada, Oklahoma, North Dakota, Kansas and Minnesota commissions. The St. Paul Livestock Exchange, which was expected to enter objections against any freight rate increases, did not appear at the Minneapolis hearing but is expected to file its objections at hearings to be held in Kansas City beginning January 4. The hearing was adjourned to Dallas, Tex., for December 7.

Commission and Court News

Interstate Commerce Commission

The Interstate Commerce Commission has rendered a decision, on complaint of Florida celery shippers, that the carload minimum of 350 crates applicable in connection with rates on celery under refrigeration in cars of less than standard length, from points in Florida to interstate and Canadian destinations, is unreasonable to the extent that it exceeds 315 crates for refrigerator cars ranging in length from 28 ft. 9 in. to 31 ft. 6 in., inside measurement, when such cars are furnished for the convenience of the carrier. Reparation was also awarded for past shipments.

The Interstate Commerce Commission has suspended from December 10, 1925, and later dates, until April 9, 1926, the operation of schedules published in various tariffs published by Agents F. A. Leland, A. C. Fonda, and other agents and carriers in southwestern territory which propose to adjust rates on various commodities between Galveston, Tex., New Orleans, La., and other Gulf ports on the one hand and interior points principally located in Arkansas, Kansas, Louisiana, Oklahoma, and Texas on the other hand. The suspended schedules were filed in purported compliance with the commission's decision in Docket No. 12798.

State Commissions

New York Rules for Highway Crossing Signals

The Public Service Commission of New York has issued regulations to govern the installation of horizontal flashing light signals at grade crossings of highways and railroads, to go into effect January 1. The commission prescribed the flashing signal as the standard last June (*Railway Age,* June 13, p. 1490) to apply whenever any new signal should be installed or any existing signal changed.

The rules now issued provide that the lights may be installed either in the center of the highway or to the right thereof, as one approaches the railroad. One signal must be placed on each side of the crossings. Where the signal is installed in the center of the highway the pole supporting the signal must be supported on a block of concrete not less than 2 ft. high and 5 ft. wide at the widest point. In the case of installation in the center of the highway the concrete base must be painted in checkerboard fashion, black and white. The roadway must be increased so that there shall be a clear width outside the concrete block on each side of not less than 12 ft. The widening of the highway must be diminished gradually away from the railroad so that the normal width of the pavement shall be reached at a point not less than 75 ft. from the signal. Each signal in the center of the highway must be equipped with a reflecting white prism fixed on the supporting pole as close as possible to the concrete base. This may consist of a single prism or a set of prisms. When installed it must be of sufficient size to be clearly seen on a clear night when illuminated by the headlight of an automobile properly equipped, when the automobile is 300 ft. from the signal.

It is provided that the lamps on the signals shall be not less than 6 ft. nor more than 9 ft. above the surface of the highway, in order to give good vision to a driver. Where physical conditions permit the order recommends that the lower limit be chosen.

When the signals are placed at the side of the highway the supporting poles must be set within 15 feet of the outside rail of the tracks, and not nearer than 6 ft. nor more than 10 ft. away from the nearest edge of the pavement of the highway, unless local conditions, such as in city streets, require a different location.

All lamps must be hooded, so as to give as good a light as possible in the day time. Each lamp when operated at normal voltage must have a range on a clear day with a bright sun at or near the zenith, of not less than 300 ft. with a spread of 12 degrees each side of the axial beam.

Each signal must have the "cross buck" or X, with the words "Railroad Crossing"; black letters on white background with a black border. Reflecting letters may be used in which case the background is black and the border white.

Foreign Railway News

Proposed Improvement of Munich-Venice Service

An agreement regarding development of traffic from Munich to Venice has been reached between the Transalpine Association and the railway companies interested in German-Italian freight traffic, according to Consul-General Curtis at Munich.

With a view to meeting the competition of North Sea ports, a number of improvements to the line were decided upon. The most important of these is the electrification of the entire line. The German railways are now engaged in the electrification of the line from Munich to Kufstein, and the Austrians have asked permission to use part of the loan of the League of Nations for electrifying Kufstein-Worgl-Innsbruck-Brenner line, while the Italians are converting to electricity the stretch from Brenner to Bozen. This leaves only the line from Bozen to Verona and from Verona to Venice, or that from Trient to Venice unelectrified.

The completion of the electrification of these lines will considerably shorten the time of travel between Munich and Venice. In view of the extensive importation of Levantine tobacco, fruits, and grain via Trieste to Munich, the question of good connections and favorable tariffs has gained much importance. By the electrification of the Munich-Venice line, these imports could pass into Bavaria via Venice and the Brenner Pass. A new direct freight tariff will be drawn up for freights between Munich and Venice.

German Preferential Rates on Export Metal Goods

A preferential freight tariff on export metal goods was granted by the German railways, effective October 1, according to Consul Barnes at Berlin. Under this schedule, preferential rates are granted on all German goods made of the following metals and alloys: Aluminum, lead, copper, nickel, zinc, tin, duraluminum, hard lead, bronze, red brass, yellow brass, German silver, nickeline, Britannia metal, and white metal. Articles plated with silver or other precious metals do not benefit by the new tariff. However, articles made in part of any of the above-listed metals, such as accumulators, electric batteries, lighting fixtures, dynamos, electric motors, gas meters, water meters, and electric meters, musical instruments, gramophone apparatus, radio sets and accessories, and vacuum bottles come within the meaning of the new tariff.

The percentage of reduction is dependent upon the distance of the haul between point of origin and port. In general, the reduction for north, central, and east Germany, Saxony, Silesia, and Bavaria north of the Danube, amounts to 20 per cent. The reduction for south Bavaria and Frankfort-on-the-Main is approximately 25 per cent; for Rhenish Hessia, 35 per cent; for Wurttemberg, 35 to 45 per cent; for the Ruhr and Westphalia, 40 per cent; for north Baden (Mannheim), 45 per cent; for the Rhine provinces to the left of the Rhine and for the Black Forest district, 50 per cent. Lead and zinc goods of tariff class C will be included in the new schedule only in those districts where the decrease equals or exceeds 30 per cent.

Miscellaneous

The following reports have been received by the Department of Commerce from its agents in various parts of the world:

The Austrian locomotive builders are more active, due to orders placed in connection with the electrification of the western lines. These builders, nevertheless, are obliged to engage in the manufacture also of other products, since orders for steam and electric locomotives are insufficient to keep the plants fully occupied.

A railroad from Samsoun to Sivas in Turkey was half completed on October 31, at which time 200 kilometers were finished on the Angora-Sivas line. Engineers are now completing technical studies and plans for a third line from Konia to the port of Adalia.

A total of 1,000 contos of reis will be advanced for construction work on the Goyaz Railway (Brazil) by the Goyaz state legislature. The railway is being built by the federal government.

A new railway will be built in Brazil, connecting the cities of Campo Grande, Nioac, Porto Murtinho, Bella Vista, and Ponta Pora, and Porto 15 de Novembro on the Parana River. The road also will connect with the Sorocabana Railway.

Equipment and Supplies

New York Central Orders New Equipment to Cost $15,100,000

THE NEW YORK CENTRAL has placed orders for the following new equipment: Ten electric locomotives for service in New York territory, from the American Locomotive Company; one passenger Diesel-electric engine from the American Locomotive Company and one freight Diesel-electric engine from the McIntosh & Seymour Corporation. These two Diesel engines are the first oil-electric road engines purchased by any railroad in the United States.

Freight car orders included 500 automobile box cars from the Standard Steel Car Company; 500 hopper cars from the Pressed Steel Car Company and 550 hopper cars from the Ralston Steel Car Company, all of 55 tons' capacity.

Passenger car orders included 150 all steel coaches; 43 steel baggage cars; 32 steel combination baggage and mail cars; 20 steel dining cars; 20 steel milk cars; 9 steel combination passenger and baggage cars. The order for these passenger cars has been divided as follows:

American Car & Foundry Company	65
Pressed Steel Car Company	59
Pullman Car & Manufacturing Corporation	55
Standard Steel Car Company	32
Osgood Bradley Car Company	25
Merchants Despatch Transportation Company	20
New York Central's company shops	18

The cost of this new equipment amounts to approximately $11,500,000.

In addition to the above the New York Central Lines have placed orders for track material consisting of tie plates, angle bars, spikes and bolts, involving an aggregate cost of approximately $3,600,000.

Locomotives

GULF COAST LINES.—See Missouri Pacific.

INTERNATIONAL-GREAT NORTHERN.—See Missouri Pacific.

THE NATIONAL RAILWAYS OF MEXICO contemplate coming in the market for from 6 to 20 consolidation locomotives.

THE SEABOARD AIR LINE has ordered 40 Mikado and 10 Mountain type locomotives from the Baldwin Locomotive Works.

THE FLORIDA EAST COAST is inquiring for 20 Mikado type locomotives, 18 Mountain type and 12 switching locomotives.

THE UNION PACIFIC is now inquiring for nine 4-10-2 oil-burning locomotives with 12,000-gal. capacity tanks for passenger service.

THE MOBILE & OHIO is inquiring for 5 Mikado type locomotives to have 26 in. by 30 in. cylinders, and 4 Pacific type locomotives to have 25 in. by 28 in. cylinders.

THE PAULISTA RAILWAY, Brazil, has ordered 4 electric locomotives from the Baldwin Locomotive Works and the Westinghouse Electric & Manufacturing Company.

THE MISSOURI PACIFIC is inquiring for 15 switching locomotives, also for 10 Mikado type locomotives for the International-Great Northern and 5 Pacific type locomotives for the Gulf Coast Lines.

Freight Cars

THE FLORIDA EAST COAST is inquiring for 50 caboose cars.

THE MOBILE & OHIO is inquiring for 500 automobile box cars of 40 tons' capacity.

THE UNION PACIFIC is inquiring for 1,000 automobile cars and 1,000 ballast cars.

THE CHICAGO & EASTERN ILLINOIS is inquiring for 500 hopper cars of 70 tons' capacity.

THE CHARLESTON & WESTERN CAROLINA is inquiring for 25 steel underframe box cars.

PICKANDS MATHER & Co., Cleveland, Ohio, is inquiring for 18 dump cars of 20 cu. yd. capacity.

THE KANOTEX REFINING COMPANY, Arkansas City, Kan., has ordered 200 tank cars from the American Car & Foundry Company.

THE NORTH WESTERN REFRIGERATOR LINE has ordered 200 refrigerator cars of 40 tons' capacity from the American Car & Foundry Company.

THE PALACE POULTRY CAR COMPANY has ordered 50 live poultry cars of 30 tons' capacity, from the Illinois Car & Manufacturing Company.

THE DELAWARE, LACKAWANNA & WESTERN has ordered 50 ballast cars from the Rodger Ballast Car Company. Inquiry for this equipment was reported in the *Railway Age* of November 21.

THE INTERNATIONAL RAILWAYS OF CENTRAL AMERICA have ordered 10 tank cars for export, from the Magor Car Corporation. Inquiry for this equipment was reported in the *Railway Age* of November 14.

THE WABASH ordered 700 automobile box cars from the Standard Steel Car Company and not from the Pullman Car & Manufacturing Corporation, as was reported in the *Railway Age* of December 5.

THE PITTSBURGH & WEST VIRGINIA is now inquiring for 700 steel gondola cars of 50 tons' capacity, and 300 composite gondola cars of 55 tons' capacity. In the *Railway Age* of December 5 this company was reported as inquiring for 1,000 gondola cars.

THE READING has ordered 500 gondola cars of 70 tons' capacity from the Bethlehem Steel Company, 250 from the Pressed Steel Car Company and 250 from the Standard Steel Car Company. Inquiry for these cars was noted in the *Railway Age* of November 28.

Passenger Cars

THE ATCHISON, TOPEKA & SANTA FE is inquiring for 9 steel dining cars.

THE FLORIDA EAST COAST is inquiring for 35 baggage cars, 6 dining cars and 15 passenger coaches.

THE MISSOURI PACIFIC has ordered 6 baggage cars from the American Car & Foundry Company and is inquiring for 8 coaches, 4 chair cars and 2 club chair cars.

THE WABASH has ordered 20 baggage cars from the American Car & Foundry Company. Inquiry for this equipment was reported in the *Railway Age* of November 14.

THE LONG ISLAND has ordered 20 steel suburban coaches for steam line service, from the American Car & Foundry Company. Inquiry for this equipment was reported in the *Railway Age* of October 31.

THE NORFOLK & WESTERN has ordered 43 all steel passenger train cars from the Bethlehem Shipbuilding Corporation. Inquiry was reported in the *Railway Age* of November 7 for 18 coaches, 6 combination passenger and baggage cars, 4 combination baggage and mail cars and 15 baggage express cars.

THE NEW YORK, NEW HAVEN & HARTFORD has ordered 6 dining cars from the Pullman Car & Manufacturing Corporation. Inquiry for 4 dining cars was reported in the *Railway Age* of October 31. An order for five, 73-ft. combination passenger and baggage, gas-electric cars has been given to the J. G. Brill Company. Negotiations for the purchase of this equipment were reported in the *Railway Age* of September 19.

Iron and Steel

THE LEHIGH VALLEY is inquiring for 1,200 tons of steel for a number of bridges near Owego, N. Y.

THE SOUTHERN has ordered 125 tons of steel for a planing mill near Knoxville, Tenn., from the Bethlehem Steel Company.

THE INTERNATIONAL-GREAT NORTHERN has ordered 17,000 tons of rails from the Bethlehem Steel Company and 7,000 tons from the Colorado Fuel & Iron Co.

Machinery and Tools

THE NEW YORK CENTRAL has placed an order for a 32-in. shaper.

THE BOSTON & MAINE has ordered two Putnam axle lathes from Manning, Maxwell & Moore, Inc.

THE INGERSOLL-RAND COMPANY has ordered two, 6-ft. radial drills from the Niles-Bement-Pond Company.

Miscellaneous

THE NEW YORK CENTRAL, marine department, is asking for bids until 12 o'clock noon, December 17, for 10 covered barges to be built on the Ellis channel system, and to be 100 ft. long and 30 ft. wide, with steel hulls and wooden houses.

THE ROYAL STATE RAILWAY DEPARTMENT of Siam, Purachatra, commissioner-general, will receive bids for the supply of fittings for bogie carriages, B. E. 2469, until 4 o'clock, February 15, 1926, at Bangkok, Siam. Tender forms, specifications and plans may be obtained from C. P. Sandberg, 100 Broadway, New York City.

Signaling

THE NEW YORK, CHICAGO & ST. LOUIS has ordered from the Union Switch & Signal Company material for an interlocking at South Whitley, Ind.; 11 mechanical and seven electric levers.

THE CHICAGO & WESTERN INDIANA has ordered from the Union Switch & Signal Company material for an electro-pneumatic interlocking, to be installed at Roosevelt Road, Chicago; 13 working levers.

THE DELAWARE, LACKAWANNA & WESTERN has ordered from the Union Switch & Signal Company an electro-pneumatic interlocking for the control of movements between two large freight yards at East Binghamton, N. Y.; 26 working levers. The switches will be operated by electro-pneumatic movements, style A-1, and the signals will be color-light.

LOCOMOTIVE REPAIR SITUATION

Date, 1925	No. locomotives on line	No. serviceable	No. stored serviceable	No. req. classified repairs	Per cent	No. req. running repairs	Per cent	Total req. repairs	Per cent
January 1	64,384	53,118	4,849	5,927	9.2	5,339	8.3	11,266	17.5
February 1	64,308	52,994	4,220	6,143	9.6	5,171	8.0	11,314	17.6
March	64,255	52,851	4,988	6,217	9.7	5,187	8.0	11,404	17.7
April 1	64,230	52,619	6,241	6,345	9.9	5,266	8.2	11,611	18.1
May 1	64,034	52,933	6,697	6,082	9.5	5,019	7.8	11,101	17.3
June 1	63,976	53,074	6,618	5,916	9.2	4,986	7.8	10,902	17.0
July 1	63,942	53,025	6,600	5,832	9.1	5,085	8.0	10,917	17.1
August 1	63,921	53,263	6,313	5,740	9.0	4,918	7.7	10,658	16.7
September 1	63,812	53,261	5,902	5,514	8.6	5,037	7.9	10,551	16.5
October	63,701	53,058	5,337	5,552	8.7	5,091	8.0	10,643	16.7
November 1	63,604	53,371	4,450	5,387	8.5	4,846	7.6	10,233	16.1

Data from Car Service Division reports.

Supply Trade News

The Sherwin Williams Company will construct a three-story addition to its plant at Chicago.

Mudge & Co., Chicago, have been appointed western representatives for the **Graham-White Sander Corporation**, Roanoke, Va.

The Allis-Chalmers Manufacturing Company, Milwaukee, Wis., has opened a district office at Lima, Peru, in charge of **W. G. Bolton.**

The Chicago Fuse Manufacturing Company, Chicago, has moved its Detroit office from the Transportation building to 429 Wayne street.

R. R. Cuthbertson, formerly manager of the Chicago office Manning, Maxwell & Moore, Inc., New York, has been appointed representative of the **Stocker-Rumley-Wachs Company,** Chicago.

The Massachusetts Mohair Plush Company, Boston, Mass., has increased the territory of **Midgley & Borrowdale,** Chicago, to now cover the railroads in the whole western territory west of Pittsburgh.

Henry C. Houck, assistant general merchandise manager of the **General Electric Company,** Schenectady, N. Y., has been appointed manager of the merchandise department at the Bridgeport works.

C. W. Damberg, formerly resident inspector of the New York, New Haven & Hartford, at New York, has been appointed railroad representative of the **A. M. Byers Company,** with headquarters in New York.

The Yale & Towne Manufacturing Company, Stamford, Conn., has bought the Miller Lock Company, of Philadelphia, Pa., and it is to be operated in the future as the Miller Lock Works of the Yale & Towne Manufacturing Company.

Herbert E. Smith, general sales manager of the **United States Rubber Company,** New York, has been elected a second vice-president in general charge of sales activities of all commodities except tires, succeeding George H. Mayo, retired.

W. J. Nugent, vice-president and general manager of the **Nugent Steel Castings Company,** Chicago, has been elected president of that company and **Prentiss Coonley** has been elected vice-president. Mr. Nugent entered the employ of the company in 1918 as vice-president, which position he held until 1921 when he became vice-president and general manager.

The Brinard Sales & Construction Company, Inc., New York, recently acquired an interest in the **Signal Accessories Corporation** of Utica, N. Y. **M. R. Briney** and **J. A. Beynon,** president and vice-president, respectively, of the Brinard Sales & Construction Company, Inc., have been elected to the board of directors of the Signal Accessories Corporation. Several new devices and lines of material are now in process of development by the Signal Accessories Corporation and additional facilities for manufacturing are under consideration. The Brinard Sales & Construction Company, Inc., will act as exclusive sales agents of the Signal Accessories Corporation.

Obituary

Lewis Johnson, department sales manager for the Chicago territory of the American Steel & Wire Company, died on December 6 following an operation.

George W. Cope, until eight years ago managing editor of the Iron Age, died on December 3, at his home in Philadelphia, Pa. Mr. Cope was born on April 9, 1847, at Norristown, Pa. In 1873 he entered the service of the American Iron & Steel Association, now the American Iron & Steel Institute. In 1883 he became associate editor of the Iron Age at New York and two years later was elected secretary of the American Iron & Steel Association, resigning in January, 1887, to become Western editor of the Iron Age at Chicago. In May, 1902, he returned to the main editorial office at New York, and during the ensuing years he served most of the time as managing editor, resigning in April, 1917.

Athur M. Kittredge, president of the Kay & Ess Company, Dayton, Ohio, died suddenly on November 26. He was born in Dayton, Ohio, on January 9, 1854, and spent all his life at that place with the exception of four years when he was at Salem. Following his graduation from the public schools he attended Wilt's Commercial College where he prepared for his business career. In 1884, he became associated with the Barney & Smith Car Company as a salesman, later serving in various positions until he became president of the company. He resigned as president of the Barney & Smith Car Company in 1912 to devote his time to developing the Kay & Ess Company, of which he had been president since 1900. Mr. Kittredge was active in the business and civic affairs of Dayton, and was a stockholder and director of a number of enterprises.

Trade Publications

CONCRETE HEATERS.—The H. H. Kress Company, Philadelphia, Pa., has issued a four-page leaflet describing and illustrating the use of its concrete heater for the heating of the water and the aggregates used in the mixing of concrete for placement during cold weather. This leaflet shows the application of the heater to a variety of concrete mixers.

RELIABLE POWER.—The Novo Engine Company, Lansing, Mich., has issued a loose leaf catalog of the products of that company. The sheet covers detailed descriptions of the one-, two- and four-cylinder gasoline engines, together with diagrams, charts and photographs. This is followed by pages devoted to various applications of this equipment with units supplied by the manufacturer. These include various types of hoists, trench pumps, water service pumps of various models, etc.

STEAM CONNECTIONS.—The Gold Car Heating & Lighting Company, Brooklyn, N. Y., has issued Bulletin No. 30 covering its 2-in. steam connections for the removal of the 1½-in. choke from between cars, giving a full 2-in. flow from the locomotive to rear end of train, including end valve, hose and fittings and steam hose coupler, which coupler, although of 2-in. size, will couple and lock with the 1½-in. couplers now in use, increasing the weight of the coupler but 14 oz.

HAYWARD BUCKETS.—The Hayward Company, New York, has issued bulletins No. 650 and 655, illustrating and describing clamshell and orange peel buckets manufactured by that company. These bulletins, which are prepared in uniform style, describe the several types of buckets of each class, outline the particular service to which they are best adapted and make specific reference to special details of the buckets upon which the manufacturer lays particular stress. Several pages of illustrations show the buckets in actual use.

DATA ON ROLLER BEARINGS.—In Bulletin No. 1559 the Hyatt Roller Bearing Company, Newark, N. J., presents a technical treatise on the selection of roller bearings of the type manufactured by that company for the various classes of service in which they are used. Consideration is taken of the various factors involved, such as speed, shaft hardness, nature of service, etc., together with eight pages of tables of dimensions and basic capacities at various speeds. Examples are given to illustrate the method of using these tables in the selection of the bearings.

"CONCENTRATION IN BOILERS."—This is the title of a 28-page bulletin, covering the methods and procedure in oil burner testing wherever the burners are fired under boilers or in warm air heating plants, which has been issued by the American Oil Burner Association, New York. The bulletin discusses such theoretical considerations as are needed for the practical application of the methods and procedure given, which apply for both industrial and domestic burners. One of the principal purposes of preparing the bulletin was to provide under one cover all the important tables and formulas needed in testing burners, thus eliminating the usual annoyance and loss of time due to having to use a number of handbooks or references.

Railway Construction

CENTRAL OF GEORGIA.—This company has authorized the construction of a station at Arlington, Ga.

GRAND TRUNK WESTERN.—The construction of a roundhouse at Pontiac, Mich., for which plans are being prepared, as reported in the *Railway Age* of December 5, may not be undertaken until some time next year.

GREAT NORTHERN.—The contract for the construction of a tunnel eight miles long through the Cascade Mountains to reduce grades and shorten the line by nine miles has been awarded to A. Guthrie & Co., St. Paul, Minn. The eastern entrance of the tunnel will be at Berne, Wash., and the western entrance near Scenic.

NEW YORK CENTRAL.—A contract has been awarded to the Frederick Snare Corporation, New York, for the construction of column foundations for a viaduct in New York at an estimated cost of $150,000. A contract for the construction of a passenger station at Canton, N. Y., to cost approximately $52,000, has been awarded to the Edw. J. Duffy Company, Inc., Weehawken, N. J. A contract for bridge steel for a bridge at Woodland, Pa., has been awarded to the Railroad Supply Company, New York; estimated cost, $49,000. Switchboard panels and equipment for circuit breaker houses at Yonkers, N. Y., and Highbridge and Morris Heights, New York City, to cost approximately $35,000, have been ordered from the General Electric Company.

PENNSYLVANIA.—This company will open bids on December 10 for grade elimination at Dixmont, Pa., and Glenfield.

QUANAH, ACME & PACIFIC.—Plans for the construction of an extension 27 miles long from MacBain, Tex., to Floydada, reported in the *Railway Age* of July 25, have been completed. Application for permission to construct the extension is now pending before the Interstate Commerce Commission.

ST. LOUIS-SAN FRANCISCO.—The rehabilitation of the Muscle Shoals, Birmingham & Pensacola, recently acquired by the Frisco, will be carried out by company forces at a cost estimated at $2,500,000. In addition to improvements to the line, the terminal facilities at Pensacola will be considerably augmented. Location surveys are now being made in contemplation of the construction of a connection from the northern end of the Muscle Shoals line at Kimbrough, Ala., to the main line of the Frisco in the vicinity of Birmingham, a distance of approximately 150 miles. Two possible routes are understood to be under consideration.

ST. LOUIS, TROY & EASTERN.—Plans have been prepared for the construction of a steel and concrete elevated approach to connect with the eastern approach of the McKinley bridge at Venice, O., at a cost of approximately $1,000,000.

UNION PACIFIC.—This company has applied to the Interstate Commerce Commission for authority to extend a branch line from Cottier, Wyo., 4 miles.

UNION PACIFIC.—A contract has been awarded to Peterson, Shirley & Gunther, Omaha, Neb., for the construction of the frame and east approach of a 2,400-ft. stone, steel and concrete bridge to be built at Omaha by the Union Pacific and the Union Stock Yards Company. The steel erection will be done by day labor. The total cost of the bridge is estimated at $360,000.

The Frisco's Program for the M. S., B. & P.

The first step in a building program of large dimensions now under consideration of the St. Louis-San Francisco will be taken shortly after January 1, when the work of rehabilitating the recently purchased Muscle Shoals, Birmingham & Pensacola will begin, President James M. Kurn of the Frisco announced recently. The Pensacola line is 143 miles in length and runs from Kimbrough, Ala., to Pensacola, Fla. Plans for the complete rehabilitation of the railroad call for an expenditure of $2,500,000.

While the Frisco will continue to serve, through connections, other ports of the gulf, there will be a large amount of traffic from Kansas City, St. Louis, Memphis and other points diverted over the new line and its connections at Birmingham, to the port of Pensacola.

"In line with our statements to the Interstate Commerce Commission when we received approval of our purchase of this railroad, we will place a force of more than 500 men in the field shortly after the first of the year, and completely rehabilitate the Pensacola Line, making it serviceable for trunk line traffic," said President Kurn.

Rehabilitation plans call for reduction in the excessive grades on the road, many of which exceed 4 per cent at this time. These grades will be reduced to 0.75 per cent. Embankments and cuts on the line are narrow, and will be widened to Frisco standard, 20 ft. wide on the embankments and 26 ft. wide at the base of the cuts. The present track has no ballast, but with the widening of the embankments and cuts, gravel ballast will be laid. Fifty miles of light rail will be taken up and new 80-pound rail laid. The light trestle bridges which the road now affords will be built up to Frisco standard, capable of carrying the heaviest engines and maximum car loadings. All buildings such as passenger stations, freight houses, coaling stations, etc., will be rebuilt or remodeled, thousands of new ties put in track, and additional water facilities, such as larger tanks, constructed.

A great part of the work will be the construction of more adequate terminal facilities at Pensacola.

Work Begins on N. Y. C. New York Improvements

The Public Service Commission of New York having approved the plans of the New York Central for electrification and the Transit Commission having approved the plans for the elimination of most of the important grade crossings, on the upper west side of New York City as far south as Seventy-second street, work on this project has been begun by the railroad company. The improvement is estimated to cost $30,000,000 and it should be completed within three years.

Because of the fact that a definite plan had not yet been adopted by the city of New York and the railroad company, removing railroad tracks from the surface of streets below Sixty-first street, the Public Service Commission recently granted the petition of the railroad to permit the use of the new type Diesel-electric locomotives for switching operations in the Sixtieth street yard and also for use in the territory extending from this yard south to the end of the line at St. John's Park. The new engines will still use the street as a right-of-way, pending an agreement regarding the reparation of grades, but the discomfort and annoyance caused by the present coal-burning engines will be eliminated.

By order of the Transit Commission, work already has begun on the elimination of the most important grade crossings on the upper west side. These crossings will be done away with by means of a viaduct which will carry the tracks over the crossings lying in the territory between One Hundred and Thirty-seventh street and St. Clair Place at One Hundred and Twenty-ninth street. The viaduct itself, however, is only a part of this work, for 3,000-ft. approaches must be constructed at each end which will make the improvement extend, in all, from One Hundred and Sixteenth street north to One Hundred and Fifty-eighth street. This viaduct and its accessories will cost approximately $3,500,000. They will be constructed without at any time interfering with the double-track operation of the line. In addition to this viaduct there is electrification program which takes in all the territory between Spuyten Duyvil at the northernmost end of Manhattan Island and Sixtieth street and which will, together with the new viaduct, necessitate the building of a new freight station, yard and milk shed to replace the present One Hundred and Thirtieth street station facilities. This new yard will be on the present level and will extend from One Hundred and Thirty-fifth street north nearly to One Hundred and Fifty-eighth street. It is estimated that the electrification itself, including new equipment, will cost somewhere in the neighborhood of $27,000,000.

New equipment to be purchased will consist of 33 electric road locomotives, 13 electric switch engines and, probably, 28 of the new Diesel oil-electric type. Of these only the oil-electrics will be operated below Seventy-second street.

The power north from Seventy-second street will be furnished by a third-rail contact, the same type as is now used on the electric division of the New York Central. The same 650-volt d. c. power will be used. It is planned to make considerable increases in the capacity of the main power stations at Yonkers and Port Morris, and also to erect sub-stations at One Hundred and Fifty-eighth street and at Seventy-second street.

Railway Financial News

ATCHISON, TOPEKA & SANTA FE.—*Acquisition.*—This company and the Gulf, Colorado & Santa Fe have applied to the Interstate Commerce Commission for authority to acquire control of the Healdton & Santa Fe by acquisition of its stock by the A. T. & S. F., and by lease to the G. C. & S. F.

AUGUSTA BELT.—*Final Value.*—The Interstate Commerce Commission has found the final value for rate-making purposes of the property owned and used for common-carrier purposes to be $95,000 as of June 30, 1916.

BAY POINT & CLAYTON.—*Final Value.*—The Interstate Commerce Commission has found the final value for rate-making purposes of the property owned and used for common-carrier purposes to be $136,000 as of June 30, 1916.

CHICAGO, MILWAUKEE & ST. PAUL.—*Investigation Hearing.*—The hearing at Washington before Commissioner Cox of the Interstate Commerce Commission in connection with the commission's investigation of the affairs of the St. Paul was concluded on December 4 and an adjournment was taken to Chicago on December 15, when President H. E. Byram will be recalled for further cross-examination. After H. E. Pierpont, traffic manager, had devoted a day to explaining how the complications in the western rate structure had held down the company's earnings, S. A. Dudley, tax commissioner for the railroad, showed the effect of increased taxation and E. C. Gibbs outlined the operations of the Milwaukee Land Company. R. Beeuwkes, electrical engineer, discussed the electrification of the line in the West, saying it had resulted in a saving of $12,000,000 on an investment of $15,000,000. He analyzed the economies effected and expressed the opinion that the electrification had fully justified itself.

CHICAGO, SPRINGFIELD & ST. LOUIS.—*Securities.*—This company has applied to the Interstate Commerce Commission for authority to issue $500,000 of first mortgage bonds, $500,000 of 6 per cent preferred stock and $25,000 of common stock for the purpose of purchasing part of the line of the Chicago, Peoria & St. Louis from Springfield to Lock Haven, Ill., 78.78 miles.

CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS.—*Dividend Rate Increased.*—Directors, meeting on December 9, declared a quarterly dividend on the common stock of 1¾ per cent which places this stock on a 7 per cent annual basis as against the 5 per cent rate established April, 1924.

DULUTH & NORTHEASTERN.—*Bonds.*—This company has applied to the Interstate Commerce Commission for authority to issue $500,000 of 20-year 5 per cent bonds, for the purpose of paying off some notes and acquiring additional equipment.

FAIRCHILD & NORTHEASTERN.—*Final Value.*—The Interstate Commerce Commission has found the final value for rate-making purposes of the property owned and used for common-carrier purposes to be $884,746 as of June 30, 1916.

GEORGIA, FLORIDA & ALABAMA.—*Equipment Trust Certificates.*—The Interstate Commerce Commission has authorized the issuance of $750,000 equipment trust certificates, series A, to be sold to F. L. Fuller Company of Cleveland, Ohio, and Freeman & Co., of New York at 95. The equipment includes 280 new box cars and 8 new passenger train cars having a total approximate cost of $741,903, and second hand equipment estimated by the carrier to have a ledger value less depreciation of $243,058.

GULF, MOBILE & NORTHERN.—*Dividends.*—Directors have declared an additional 4¼ per cent on the preferred stock, payable January 1 to stockholders of record December 15. Of this dividend, ¾ of 1 per cent is to be considered as an adjustment of the regular 6 per cent dividend to January 1, 1925, this covering a change in dividend date from November 15 to January 1. This adjustment will bring the total dividend this year to 6¾ per cent, 6 per cent having already been paid. The remainder of the present dividend is to be charged against accumulations on the preferred stock which on January 1 will be 20 per cent. It is understood that the directors propose to pay the regular 6 per cent next year and that they hope to effect a further reduction of accumulations.

KANSAS CITY SOUTHERN.—*Acquisition.*—This company has applied to the Interstate Commerce Commission for authority to acquire control by lease of the Texarkana & Fort Smith, which it controls by stock ownership. The Texarkana & Fort Smith has also applied for authority to issue $10,000,000 of bonds, to be guaranteed by the Kansas City Southern, under a new first mortgage, to pay off $5,591,000 of existing bonds so that the new mortgage will be a first and prior lien, and to provide for additions and betterments.

MAINE CENTRAL.—*Bonds.*—This company has applied to the Interstate Commerce Commission for authority to issue $50,000 and to sell $4,000,000 of first and refunding mortgage 6 per cent bonds, to retire $3,123,000 of notes to the U. S. government and reimburse the treasury for expenditures, to be sold at 97½ to Kidder, Peabody & Co.

MICHIGAN CENTRAL.—*Extra Dividend.*—Directors, meeting on December 9, declared an extra dividend of 7½ per cent in addition to the regular semi-annual dividend of 10 per cent payable January 29 to stockholders of record on December 31.

MISSOURI PACIFIC.—*Equipment Trusts Sold.*—Kuhn, Loeb & Co. have sold at an average price of 98, giving an average yield of 4.82 per cent, $4,830,000 4½ per cent equipment trust certificates, series E.

NEW YORK CENTRAL.—*Dividends of Subsidiary Companies.*—See Cleveland, Cincinnati, Chicago & St. Louis and Michigan Central.

WABASH.—*Equipment Trusts Sold.*—Kuhn, Loeb & Co. have sold at an average price of 98, giving an average yield of 4.82 per cent, $4,185,000 4½ per cent equipment trust certificates, series F.

Dividends Declared

Bangor & Aroostook.—Common, 75c, quarterly; preferred, 1¾ per cent, quarterly, payable January 1 to holders of record December 15.

Buffalo & Susquehanna.—Common, ¾ per cent, quarterly; preferred, 2 per cent, both payable December 30 to holders of record December 15.

Chicago, Rock Island & Pacific.—6 per cent preferred, 3 per cent, semi-annually; 7 per cent, preferred, 3½ per cent, semi-annually, both payable December 31 to holders of record December 11.

Cleveland, Cincinnati, Chicago & St. Louis.—Common, 1¾ per cent, quarterly; preferred, 1¾ per cent, quarterly; both payable January 20 to holders of record December 31.

Consolidated Rys. of Cuba.—Preferred, 1½ per cent, quarterly, payable January 1 to holders of record December 15.

Cuba Railroad.—Common, $1.40, quarterly, payable December 31 to holders of record December 31.

Great Northern.—Preferred, 2½ per cent, semi-annually, payable February 1 to holders of record December 24.

Gulf, Mobile & Northern.—Arrears, 3½ per cent; adj., ¾ per cent, payable January 1 to holders of record December 15.

Lehigh Valley.—Common, 1¾ per cent, preferred, 2½ per cent; both payable January 2 to holders of record December 19.

Michigan Central.—10 per cent. semi-annually; 7½ per cent, extra; both payable January 29 to holders of record December 31.

New York Central.—1¾ per cent, quarterly; payable February 1 to holders of record December 31.

Old Colony.—1¾ per cent, quarterly, payable January 1 to holders of record, December 12.

Pere Marquette.—Common, 1 per cent, quarterly, payable January 2 to holders of record December 15. Prior preference, 1¾ per cent, quarterly; preferred, 1¾ per cent, quaterly, both payable February 1 to holders of record January 15.

Pittsburgh & Lake Erie.—$2.50, semi-annually, payable February 1 to holders of record January 11.

Pittsburgh, Fort Wayne & Chicago.—Common, 1¾ per cent, quarterly, payable January 2 to holders of record December 10. Preferred, 1¾ per cent, quarterly, payable January 5 to holders of record December 10.

St. Louis Southwestern.—Preferred, $1.25, quarterly, payable December 31 to holders of record December 15.

Toronto, Hamilton & Buffalo.—Stock dividend, 20 per cent; cash, 6 per cent; both payable December 31 to holders of record December 28.

Virginian Railway.—Common, 6 per cent, payable December 31 to holders of record December 21.

Trend of Railway Stock and Bond Prices

	Dec. 8	Last Week	Last Year
Average price of 20 representative railway stocks	94.80	93.35	79.98
Average price of 20 representative railway bonds	93.42	93.09	89.06

Railway Officers

Executive

Hal Gaylord has been appointed assistant to the president of the Kansas City Southern, with headquarters at Kansas City, Mo., a newly created position.

J. M. Kurn, president of the St. Louis-San Francisco, has been elected also president of the Muscle Shoals, Birmingham & Pensacola, which was recently acquired by the Frisco. **J. E. Hutchison,** vice-president in charge of operation, and **B. T. Wood,** vice-president and chief purchasing officer of the St. Louis-San Francisco, have been elected to similar offices on the Muscle Shoals, Birmingham & Pensacola. **W. B. Hareson,** receiver for the Muscle Shoals, Birmingham & Pensacola prior to its purchase by the Frisco, has been elected vice-president.

Financial, Legal and Accounting

F. H. Hamilton, vice-president, secretary and treasurer of the St. Louis-San Francisco, **E. T. Miller,** general solicitor, and **E. H. Bunnel,** controller, have been elected also to similar positions on the Muscle Shoals, Birmingham & Pensacola.

E. W. Peabody, who has been promoted to auditor of the Missouri-Kansas-Texas, with headquarters at St. Louis, Mo., was born on February 9, 1874, at St. Louis, and was graduated from the University of Chicago in 1896. He entered railway service in 1899 in the operating department of the Macon, Dublin & Savannah, where he remained until March, 1903, when he was employed as a clerk on the Atchison, Topeka & Santa Fe. Mr. Peabody was appointed a trainmaster on the San Francisco & Northwestern in 1907, and in 1909 was appointed superintendent of transportation of the American Railway of Porto Rico. In 1911 he returned to the Santa Fe as chief clerk to the general manager of the western lines, and in 1913, was appointed traveling accountant of the Illinois Central. Mr. Peabody entered the service of the Missouri-Kansas-Texas in 1915, when he was appointed statistician. During federal control he was appointed treasurer for the receiver, and in March, 1920, was appointed assistant to the receiver. Mr. Peabody was elected secretary of the Missouri-Kansas-Texas in May, 1923, and continued in that capacity until his recent promotion to auditor.

E. W. Peabody

D. E. McInnis, a member of the firm of solicitors for Oklahoma of the Atchison, Topeka & Santa Fe, with headquarters at Oklahoma City, Okla., has been promoted to general solicitor, with headquarters at Chicago, succeeding **Gardner Lathrop,** who has been appointed special counsel. Mr. Lathrop was born on February 16, 1850, at Waukesha, Wis., being graduated from the University of Missouri in 1867, from Yale University in 1869, and from the Law School of Harvard University in 1873. He entered railway service as local attorney for the Santa Fe at Kansas City, Mo., in 1876. He was promoted to solicitor for Missouri and Iowa in 1886, and held that position until April 1, 1905, when he was promoted to general solicitor, with headquarters at Chicago. Mr. Lathrop continued in that capacity until his recent appointment as special counsel. The appointment, which is effective January 1, was made in order to relieve Mr. Lathrop of his routine duties as general solicitor while retaining his counsel in special cases.

N. A. Phillips, who has been promoted to secretary of the Missouri-Kansas-Texas, with headquarters at St. Louis, Mo., was born at Cisne, Ill., on October 7, 1887, and entered railway service in March, 1907, as a clerk and stenographer in the office of the general foreman of bridges and buildings of the St. Louis-San Francisco. He was employed in a similar capacity in the general freight, passenger and purchasing departments of the Mississippi River & Bonne Perre in September, 1907, and was promoted to chief clerk to the purchasing agent in September, 1910. Mr. Phillips entered the service of the Missouri-Kansas-Texas in January, 1912, as a clerk in the office of the president. In September, 1913, he was promoted to secretary to the president, which position he left in April, 1918, to enlist in the 66th Engineers Regiment, a railway operating organization. Returning to the Missouri-Kansas-Texas as secretary to the president in June, 1919, Mr. Phillips was promoted to assistant secretary of the road in April, 1923, which position he held until his recent promotion to secretary.

Operating

W. H. Blake, superintendent of the Tampa & Gulf Coast and the Tampa Northern, has also been appointed superintendent of the West Florida division of the Seaboard Air Line, with headquarters at Tampa, Fla.

J. D'Esposito, chief engineer of the Chicago Union Station Company, has been appointed also acting general manager, succeeding Colonel N. L. Howard, whose election as president of the Chicago Great Western was reported in the *Railway Age* of November 7.

F. Duffy has been appointed trainmaster of the Seaboard Air Line, the Tampa & Gulf Coast and the Tampa Northern, with headquarters at Tampa, Fla. **F. M. Bennett** has been appointed assistant trainmaster, with headquarters at Waldo, Fla. **A. G. Kipple** has been appointed chief dispatcher, with headquarters at Tampa, Fla.

J. B. Silaz, superintendent of the Jonesboro, Lake City & Eastern, with headquarters at Jonesboro, Ark., has been appointed assistant superintendent of the Jonesboro subdivision of the River division of the St. Louis-San Francisco, with the same headquarters, the Jonesboro, Lake City & Eastern, having been acquired by the Frisco, and made a subdivision of the River division.

A. L. Haldeman, who has been on leave of absence on account of illness, has returned to his position as superintendent of the Cedar Rapids-Minnesota division of the Chicago, Rock Island & Pacific, with headquarters at Cedar Rapids, Ia. **F. A. Bogue,** acting superintendent during Mr. Haldeman's absence, has returned to his position as trainmaster of the Cedar Rapids-Minnesota division, with the same headquarters.

C. W. Bearden, superintendent of transportation of the Chicago & Alton, with headquarters at Chicago, Ill., has been transferred to Bloomington, Ill. **Alex Grant** has been appointed superintendent of car service at Chicago, a newly created position. He will have charge of all reports pertaining to car movement, car records per diem and tracing, heretofore under the jurisdiction of the superintendent of transportation.

S. E. Willis, trainmaster on the Colorado division of the Missouri Pacific, with headquarters at Hoisington, Kan., has been transferred to the Wagoner district of the Central division, with headquarters at Van Buren, Ark., succeeding W. E. Romine. **J. C. Paslay,** trainmaster of the River and Independence districts of the Eastern division, with headquarters at Jefferson City, Mo., has been transferred to the Colorado division, in place of Mr. Willis. **E. B. Stevenson** has been appointed trainmaster of the River and Independence districts, succeeding Mr. Paslay. **C. B. Wilbanks** has been appointed assistant trainmaster of the East and West and Herrin districts of the Illinois division, with headquarters at Bush, Ill.

W. C. Owens, who has been promoted to superintendent of the Kamloops division of the Canadian National, with head-

quarters at Kamloops Junction, B. C., was born on October 29, 1884, at Manitou, Man., and entered railway service in May, 1904, in the legal department of the Canadian Northern, now a part of the Canadian National. He was transferred as a clerk to the construction department in May, 1907, being employed in the operating department as freight brakeman in September, 1908. Mr. Owens was promoted to conductor in July, 1911, and in November, 1919, was promoted to trainmaster, with headquarters at Prince Albert, Sask. In February, 1920, he was transferred to Saskatoon, Sask., later being promoted to assistant division superintendent there. Mr. Owens was transferred to the Kamloops division in May, 1923, where he remained until his recent promotion to superintendent of the Kamloops division.

Henry C. White, who has been promoted to superintendent of terminals of the Canadian National and the Grand Trunk, with headquarters at Port Huron, Mich., was born on August 5, 1877, at Frankville, Ont., and entered railway service in February, 1896, as a switchman on the Canada Atlantic, now a part of the Canadian National. He was promoted to telegrapher and agent in April, 1897, and in May of the following year was promoted to train dispatcher. He was transferred to the Ottawa division of the Grand Trunk in November, 1905, where he remained until April, 1911, when he was promoted to rules instructor. Mr. White was reappointed train dispatcher in August of the same year, and was promoted to chief train dispatcher in July, 1912. He was promoted to trainmaster on the Chicago division in June, 1917, transferred to the Detroit division in August, 1919, and transferred back to the Chicago division in August, 1920. He remained there until his recent promotion to superintendent of terminals.

H. C. White

C. S. Christoffer, who has been promoted to general superintendent of the Northern district of the Chicago, Milwaukee & St. Paul, with headquarters at Minneapolis, Minn., was born at Stoughton, Wis., on June 29, 1882, and entered railway service as a bill clerk on the Chicago, Milwaukee & St. Paul, in 1898. He was later promoted to telegraph operator and station agent and in 1901 was promoted to train dispatcher on the Northern division, later serving in a similar capacity on the Superior and La Crosse divisions. Mr. Christoffer was promoted to trainmaster of the terminals at Milwaukee, Wis., in 1910, and was transferred to the Superior division in 1913. He was transferred to the Illinois division in 1916 and in the following year was promoted to assistant superintendent of the Milwaukee terminals. He was promoted to superintendent of terminals at Chicago in December, 1917, and held that position until April, 1923, when he was transferred to the Iowa and Dakota division. Mr. Christoffer continued there until his recent promotion to general superintendent of the Northern district.

C. S. Christoffer

Mechanical

H. Y. Harris has been appointed master mechanic of the Seaboard Air Line, the Tampa & Gulf Coast and the Tampa Northern, with headquarters at Tampa, Fla. **R. R. Harris** has been appointed road foreman of engines, with headquarters at Tampa, Fla., and **H. M. Agin** has been appointed road foreman of engines, with headquarters at Waldo, Fla.

Engineering, Maintenance of Way and Signaling

H. O. Kaigler has been appointed division engineer of the Seaboard Air Line, the Tampa & Gulf Coast and the Tampa Northern, with headquarters at Tampa, Fla.

Purchasing and Stores

R. E. Clark, general purchasing agent of the Nevada Northern, has resigned to become vice-president in charge of sales of the American Rubber Manufacturing Company, Oakland, Cal.

Obituary

John C. Patterson, for nearly 30 years connected with the engineering department of the Great Northern, who died in Los Angeles, Cal., on November 6, was born at Lawrence, Mass., on March 10, 1858, and graduated from the Maine State College with the degree in civil engineering in 1878. He entered railway service in 1880 as an assistant engineer on the St. Paul, Minneapolis & Manitoba, now a part of the Great Northern, being later employed in a similar capacity on new lines of the company in Minnesota and North Dakota and on the Northern Pacific, surveying and constructing branch lines in the state of Washington. After several years service as resident engineer of the Montana Central, and later in charge of construction of the Butte, Anaconda & Pacific, Mr. Patterson was transferred by the Great Northern to St. Paul as resident engineer in March, 1902, being promoted to principal assistant engineer in March, 1903. On January 1, 1906, he was promoted to assistant chief engineer, and held that position until May 1, 1913, when he resigned to take charge of several construction projects for A. Guthrie & Co., contractors and engineers of St. Paul. From 1917 to 1921 Mr. Patterson was employed by the Great Northern as assistant engineer on special work, mostly in connection with federal valuation. He retired from active service in December, 1921.

Orin P. McCarty, assistant to the passenger traffic manager of the Baltimore & Ohio Railroad, died on December 7 at his home in Baltimore. Mr. McCarty was a native of Massillon, Ohio, where he was born in 1848. He entered railway service June 1, 1864, as a clerk in the general ticket office of the Cincinnati & Chicago Air Line Railway. He served later as city ticket agent of the Chicago & Great Eastern. In 1866 went with the Columbus & Indianapolis Central and the Pittsburgh, Cincinnati & St. Louis. In January, 1870, and for the next ten years he was chief clerk in the general ticket office of the Indianapolis, Bloomington & Western and for months was identified with the passenger affairs of the Union Pacific Railway. He was promoted to assistant general ticket agent of the same road in 1887 and in 1888 became chief clerk of the Baltimore & Ohio's general passenger department, being promoted the following year to assistant general passenger agent and general passenger agent of its southwestern lines in 1890. Between 1894 and 1897 he was connected with the Southern Pacific, returning to the Baltimore & Ohio Southwestern as general passenger agent in September of the latter year. Fourteen years later he was advanced to passenger traffic manager of the Baltimore & Ohio, his jurisdiction being extended over the whole system of lines owned and leased on October 4, 1916. During 1918-1919 he served a term as president of the American Association of Passenger Traffic Officers. In December, 1917, Mr. McCarty was relieved of active duties and appointed assistant to the passenger traffic manager.